MONTREAL PROTOCOL

ON SUBSTANCES THAT DEPLETE

THE OZONE LAYER

UNEP

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TECHNOLOGY AND ECONOMIC ASSESSMENT PANEL

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EVALUATION OF 2014 CRITICAL USE NOMINATIONS FOR METHYL BROMIDE

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The text of this report is composed in Times New Roman.

Co-ordination: **Methyl Bromide Technical Options Committee**

Composition of the report: Co-chairs Ian Porter, Marta Pizano, Mohammed Besri

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The TEAP thanks the UN Multilateral Fund Secretariat in Montreal, Canada, for hosting the TEAP meeting, 5-9 May 2014, where the final elements for this report were discussed and decisions were taken how to finalise the report.

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Foreword

The May 2014 TEAP Report

The May 2014 TEAP Report consists of six volumes:

Volume 1: May 2014 TEAP Progress Report

Volume 2: May 2014 TEAP Essential Use Nominations Report

Volume 3: May 2014 TEAP Critical Use Nominations Report

Volume 4: TEAP XXV/5 Task Force Report on information on alternatives to ODS

Volume 5: TEAP XXV/6 Report on TOC appointment processes, future configurations and the streamlining of annual (progress) reports

Volume 6: TEAP XXV/8 Task Force on the funding requirement for the 2015-2017 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol

- **Volume 1** contains the TOC progress reports and a chapter "Other TEAP matters", discussing the status of (re-) nominations and challenges to the participation of experts, as well as an annex with the list of TEAP and TOC members, status May 2014
- **Volume 2** contains the assessment of the 2014 essential use nominations by the CTOC and the MTOC
- **Volume 3** contains the assessment of the 2014 critical use nominations by the MBTOC
- **Volume 4** is the report of the TEAP Task Force responding to Decision XXV/5 on information on alternatives to ODS in the refrigeration and air conditioning, foams, medical uses, fire protection and solvent sectors
- **Volume 5** contains a description by the TEAP on the TOC appointment processes and their future configurations and the streamlining of the annual (progress) reports in response to Decision XXV/6
- **Volume 6** is the report of the TEAP Task Force responding to Decidion XXV/8 on the funding requirement for the 2015-2017 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol.

This is Volume 3 on the assessment of critical use nominations by the MBTOC.

The UNEP Technology and Economic Assessment Panel (TEAP):

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MAY 2014 REPORT OF THE TECHNOLOGY AND ECONOMIC ASSESSMENT PANEL

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MBTOC INTERIM CUN REPORT – MAY 2014

Common Acronyms

1,3-D	1,3-dichloropropene
A5	Article 5 Party
ASD	Anaerobic soil disinfestation
CUE	Critical Use Exemption
CUN	Critical Use Nomination
DOI	Disclosure of Interest
EC	European Community
EMOP	Extraordinary Meeting of the Parties
EPA	Environmental Protection Agency
EPPO	European Plant Protection Organisation
IM	Iodomethane
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
ISPM	International Standard Phytosanitary Measure
LPBF	Low Permeability Barrier Film (including VIF films)
MB	Methyl Bromide
MBTOC	Methyl Bromide Technical Options Committee
MITC	Methyl isothiocyanate
MOP	Meeting of the Parties
MS	Metam sodium
OEWG	Open Ended Working Group
Pic	Chloropicrin
QPS	Quarantine and Pre-shipment
SF	Sulfuryl fluoride
TEAP	Technology and Economics Assessment Panel
TIF	Totally Impermeable Film
VIF	Virtually Impermeable Film
VOC	Volatile Organic Compounds

2014 Evaluations of Critical Use Nominations for Methyl Bromide and Related Matters – Interim Report

Table of Contents

2014 Evaluation of Critical Use Nominations for Methyl Bromide and Related Matters

1.1 Scope of the Report

The 2014 interim report provides evaluations by MBTOC of Critical Use Nominations (CUNs) submitted for methyl bromide (MB) for 2015 and 2016 by six Parties: three non-A5 (Australia, Canada and USA) and three A5 (Argentina, China and Mexico). One additional A5 Party (Malaysia) submitted a CUN, but later informed the Ozone Secretariat and MBTOC that it was withdrawing the nomination. As per provisions set out in Decision IX/6 (Annex I, MOP16), CUNs were submitted by the Parties to the Ozone Secretariat in accordance with the timetable shown in paragraph 1 of Annex I, Decision XVI/4. Given that January 1st, 2015 is the deadline for phasing-out methyl bromide in A5 Parties, these Parties are now able to submit CUNs according to provisions set out in the Protocol.

This report also provides 1) interim recommendations for the CUNs for which the Parties provided information as per the timelines set at the 25th Meeting of the Parties; 2) information from Parties on stocks (Decision Ex.1/4 (9f)); 3) partial information on actual MB consumption for critical uses (in accordance with Decision XVII/9) and 4) apparent adoption rates of alternatives, as evidenced by trend lines on reduction of MB CUNs (in accordance with Decisions XIX/9, XX/5). It is noted that trend lines on adoption may not necessarily indicate true adoption rates for alternatives, as the use of stocks of MB that may have been available to the same sector or areas of production may have increased or fallen within the sector due to a range of circumstances. MBTOC notes that stock volumes have significantly decreased in recent years.

Standard presumptions used in the 2014 round were the same as those used in the 2013 evaluations of the CUNs. These standard presumptions are subject to continual review. However, any changes proposed by MBTOC are required to be approved by the Party's in the MOP preceding the year of assessment based on a draft Decision presented to the MOP in accordance with paragraph 2 in Annex 1 to the report of MOP16.

1.2. Critical Use Nominations for Methyl Bromide

1.2.1. Mandate

Under Article 2H of the Montreal Protocol, Parties not operating under Article 5(1) are required to phase-out all production and consumption (defined as production plus imports minus exports) of MB after 1 January 2005. The same requirements apply to Parties operating under Article 5(1) after 1 January 2015. However, the Parties agreed to a provision enabling exemptions for those uses of MB that qualify as critical. Parties established criteria, under Decision IX/6 (see Annex 1 of this report) of the Protocol, which all critical uses need to meet in order to qualify for an exemption. TEAP and its MBTOC have provided guidance to the Parties on recommendations regarding critical use exemptions in accordance with Decisions IX/6, Annex I of Decision XVI/2 and a number of subsequent decisions (XVI/2; XVII/9, XVIII/13, XIX/9, XX/5, XXI/11, XXII/6, XXIII/4, XXIV/5 and XXV/4).

Decision XXIV/5 differed from past decisions in that it reinforced that Parties 'take all reasonable steps to explore further the possibility of transitioning to technically and economically feasible alternatives… and to ensure that the Methyl Bromide Technical Options Committee is fully aware of these efforts'.

Decision XXV/4 requests Australia and Canada to submit, by the 36th OEWG, the available results of their research programmes on alternatives to MB to the TEAP for its consideration. It is anticipated that TEAP will consider the progress by Parties to this decision when making its final recommendations. This same Decision further requests TEAP to analyse the impact of national, subnational and local regulations and law on the potential use of methyl bromide alternatives, to report annually on the status of re-registration and review of methyl bromide uses for the applications reflected in the CUNs, including any information on health effects and environmental acceptability

and to report annually on the status of registration of alternatives and substitutes for methyl bromide, with particular emphasis on possible regulatory actions that will increase or decrease dependence on methyl bromide.

MBTOC considers that any chemical or product registered for a particular use has been through the rigours of the national local regulatory authorities and accepts that these fall within guidelines for health effects and environmental acceptability. MBTOC particularly takes note of those products, which are generally listed in any CUN application.

1.2.2 Fulfilment of Decision IX/6

Decision XVI/2 and Decision XXI/11 directed MBTOC to indicate whether all CUNs fully met the requirements of Decision IX/6. When the requirements of Decision IX/6 are met, MBTOC can recommend critical uses of MB. Where some of the conditions are not fully met, MBTOC can recommend a decreased amount depending on its technical and economic evaluation, or determine the CUN as "unable to assess" and request further information from the Party. When the information is submitted, MBTOC is required to re-assess the nomination, following the procedures defined in Annex 1 of the Sixteenth Meeting of the Parties.

MBTOC recommended less methyl bromide that requested in a CUN when technically and economically feasible alternatives were considered to be available or, when the Party failed to show that there was no technically and economically feasible alternative. In this round, MBTOC did not recommend two nominations as important information essential to the assessment had not been supplied and the nomination did not meet the requirements of Decision IX/6. Also, in this round of CUNs, as in previous rounds, MBTOC considered all information provided by the Parties, including answers to questions requested by MBTOC up to the date of the evaluation.

Now that technically and economically feasible alternatives have been identified for virtually all applications of methyl bromide, regulations on the use of these alternatives often determine their availability to the end users. In addition, comparative information on the economic feasibility/infeasibility of the use of alternatives compared to MB is critical to the outcomes of present and future CUNs. In particular, MBTOC needs annual updates of the economics information evaluating the costs of alternatives.

1.2.3 Reporting of MB Consumption for Critical Use

A number of decisions (Ex. I/3(5); XVI/2(4); XVII/9(5)), XVIII/13(6), XIX/9(7), XX/5(7), XXI/11(6), XXII/6(5), XXIII/4(4), XXIV/5 and XXV/4 set out provisions which request Parties to submit by 1st February each year information on how criteria in IX/6(1) is met when licensing permitting or authorizing CUEs. Decision XVII/9 of the 17th MOP specifically requests TEAP and its MBTOC to "*report for 2005 and annually thereafter, for each agreed critical use category, the amount of methyl bromide nominated by a Party, the amount of the agreed critical use and either:*

(a) The amount licensed, permitted or authorised; or
(b) The amount used

Since the start of the CUN reviews in 2003, MBTOC has provided tables of the historic amounts of MB nominated and agreed for each critical use (Annexes III and IV). Additionally Parties provide accounting frameworks on amounts used for critical uses and stocks as required under Dec Ex.1/4 (9f). (Table 1-3).

In 2013, the Meeting of the Parties authorised Australia to use 29.760 tonnes of MB for strawberry runners and 1.187 t for use on rice. The Party exempted 32.134 tonnes and 31.521 t was reportedly used for the critical uses in 2013. For Canada, the Meeting of the Parties in 2013 authorised 13.109 tonnes for strawberry runners. In the accounting framework the party reported that 12.867 t was used for critical uses in 2013. For the United States, the MOP authorised 562.326 tonnes for a wide range

of crops and commodities in 2013 (Annex III and IV). In their allocation regulation for 2013 critical uses, the Party reported that 562.326 tonnes had been approved for pre-plant soil uses and postharvest uses (Federal Register 78, July 22, 2013).

This is the first year that A5 Parties are able to submit CUNs. Under Decision Ex1/4. (9f) those A5 Parties which are granted critical use will need to provide accounting frameworks for these uses in forthcoming years.

1.2.4 Trends in Methyl Bromide Use for CUEs since 2005

The nominated amounts and the apparent rate of reduction in MB or adoption of alternatives achieved by Parties are shown in Table 1-5, as well as Figures 1-1 and 1-2. It is noted that for those non-A5 countries that have pre-2005 stocks of MB that are being drawn down, the reductions in CUEs from year to year cannot be taken directly as evidence of adoption of alternatives since pre-2005 stocks may have been used (or may still be used) in the same sectors. Tables 1-9 and 1-11 in particular show the amounts nominated by Parties for soil uses, and structures and commodity uses and the final recommendations for 'Critical Use' in 2015 and 2016.

Decision XVII/9 requires TEAP to show trends in the phase out of the critical uses of MB by the Parties (Fig 1-1 and Fig 1-2, Annexes III and IV). Since 2005, there has been a progressive trend in the reduction of methyl bromide for CUNs by all Parties for both soil and post- harvest uses, although this has occurred at different rates. Figs 1-1 and 1-2 show reduction trends in amounts approved/nominated by Parties for 'Critical Use' from 2005 to 2016 for all the remaining soil and structures and commodity uses. The complete trends in phase out of MB by country, as indicated by change in CUE, are shown in Annexes III and IV.

1.2.5 Disclosure of Interest

As in past reports, MBTOC members were requested to update their disclosure of interest forms relating specifically to their level of national, regional or enterprise involvement for the 2014 CUN process. The Disclosure of Interest declarations for 2014, updated in March 2014 can be found on the internet at http://ozone.unep.org/new_site/en/disclosure_of_interest.php?body_id=6&committee_id=6 and a list of members in Annex I to the 2014 TEAP Report, Volume One. As in previous rounds, some members withdrew from or abstained to participate in a particular CUN assessment or only provided technical advice on request, for those nominations where a potential conflict of interest was declared.

MBTOC co-chairs further briefed members of recent updates introduced by the Parties to the Terms of Reference (TOR) of the TEAP/TOC, as per recent Decisions XXIV/8 and XXV/6.

1.2.6 Article 5 issues

Methyl bromide is due to be fully phased out in A5 Parties by January 1, 2015, 10 years after full phaseout by non-A5 Parties. In both cases, uses for feedstock and QPS are exempted from phase out under the control measures described in Article 2H. There is also provision for exemption from phase out for uses deemed 'critical' according to Article 2H, as complying with Decision IX/6.

Presently, approximately 85% of the controlled consumption in A5 Parties has been phased out, ahead of the 2015 deadline. This has been achieved largely as a result of investment projects implemented by the Montreal Protocol agencies, with MLF funding, bilateral cooperation and also national funding. The large majority of A5 Parties still consuming MB have agreements in place with the Executive Committee for full phaseout of methyl bromide by 1st January 2015 at the latest, sometimes earlier. These are usually accompanied by a commitment from the Party in question to put in place policy packages to restrict consumption of MB for controlled uses after the phase-out. MBTOC notes that all A5 Parties submitting CUNs in this round have received funding from the MLF for complete phaseout of MB in their countries by 1st January 2015 at the latest, sometimes earlier.

Article 5 Parties may submit nominations for Critical Use Exemptions (CUEs) for uses they consider appropriate for the year 2015 and possibly subsequently. The first CUNs by non-A5 Parties were made in 2003 for CUEs to be in place in 2005. Four A5 Parties submitted CUNs in this round for extended use of MB in 2015; one of these – Malaysia – later withdrew its CUN.

1.2.7 Consideration of Stocks, Decision Ex.1/4 (9f)

One criterion for granting a critical use is that MB "*is not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide*" (paragraph 1 (b) (ii) of Decision IX/6). Parties nominating critical use exemptions are requested under decision Ex.I/4(9f) to submit an accounting framework with the information on stocks. MBTOC has not reduced its recommended amount of methyl bromide in consideration of stocks held by the Party and has instead relied on Parties to take this into consideration when approving the amounts recommended by TEAP for each nomination. To assist the Parties with their consideration of stocks, and in accordance with Decision XVIII/13(7), a summary of the data on stocks as reported by the Parties in the first year for accounting in 2006, and then reports submitted in 2012 and 2013 are summarized in Tables 1-1 to 1-3 below.

Parties may wish to consider this information in the light of Decision IX/6 1(b) (ii) when authorising methyl bromide for critical uses.

Efficient functioning of commerce requires a certain level of available stocks and additional stocks to respond to emergencies. Additionally, stocks may be held on behalf of other Parties or for exempt uses (feedstock and QPS uses). The correct or optimal level of stocks for virtually every input to production is not zero. In addition, stocks are privately owned and may not be readily available for critical uses, or there may be national regulations preventing the transfer of stocks. Despite these restrictions, Parties may wish to ensure that stocks are used wherever possible in order to minimize the quantity of MB that need to be produced each year for critical uses. Tables 1-1 to 1-3 report the quantities of MB 'on hand' at the beginning and end respectively of 2005, 2012 and 2013 as required under Decision XVI/6. The earlier CUN reports identified stocks for the other years.

Table 1-1. Quantities of MB (metric tonnes) 'on hand' at the beginning and end of 2005, as first reported by Parties in 2006/2007 under Decision XVI/6.

Party	Critical use exemptions authorized by MOP for 2005	Quantity of MB as reported by Parties (metric tonnes)				
		Amount on hand at start of 2005	Quantity acquired for CUEs in 2005 (production +imports)	Amount available for use in 2005	Quantity used for CUEs in 2005	Amount on hand at the end of 2005
Australia	146.6	0	114.912	114.912	114.912	0
Canada	61.792	0	48.858	48.858	45.146	3.712
EU	4 392.812	216.198	2 435.319	2 651.517	2 530.099	121.023
Israel	1 089.306	16.358	1 072.35	1 088.708	1 088.708	0
Japan	748	0	594.995	594.995	546.861	48.134
New Zealand	50	6.9	40.5	47.4	44.58	2.81
USA(a)	9 552.879		7 613	not reported	7 170	443

Additional information on stocks was reported on US EPA website, September 2006: MB inventory held by USA companies: 2004 = 12,994 tonnes; 2005 = 9,974 tonnes.

Table 1-2. Quantities of MB 'on hand' at the beginning and end of 2012, as reported by Parties in 2012 under Decision XVI/6.

Party	Critical use exemption authorized by MOP for 2012	Quantity of MB as reported by Parties (metric tonnes)				
		Amount on hand at start of 2012	Quantity acquired for CUEs in 2012 (production +imports)	Amount available for use in 2012	Quantity used for CUEs in 2012	Amount on hand at the end of 2012
Australia	33.413	0	32.593	32.593	32.593	0
Canada	16.281	1.455	12.186	13.641	12.725	0.916
Japan	219.609	9.726	155.902	165.628	174.708	2.709
USA	1023 [760 t authorization and 263 t critical stock allowances]	? [(c)] 1249(a)	759	2008	759	? [(c)] 627(b)

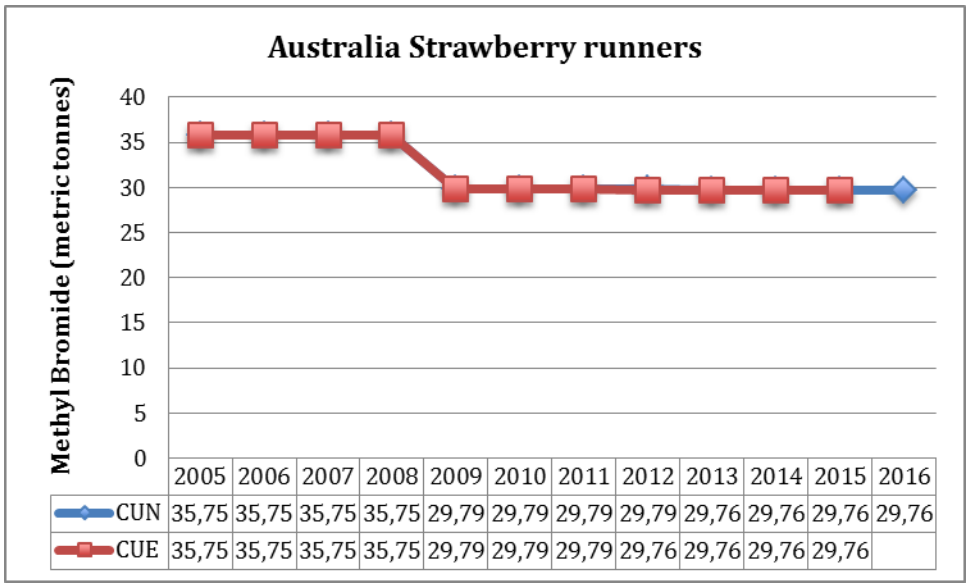
(a) Amount of pre-2005 stocks available at the start of 2012
(b) Amount of pre-2005 stocks available at the end of 2012
(c) Amount of post 2005 stocks are not reported.

Table 1-3. Quantities of MB 'on hand' at the beginning and end of 2013, as reported by Parties in 2013 under Decision XVI/6.

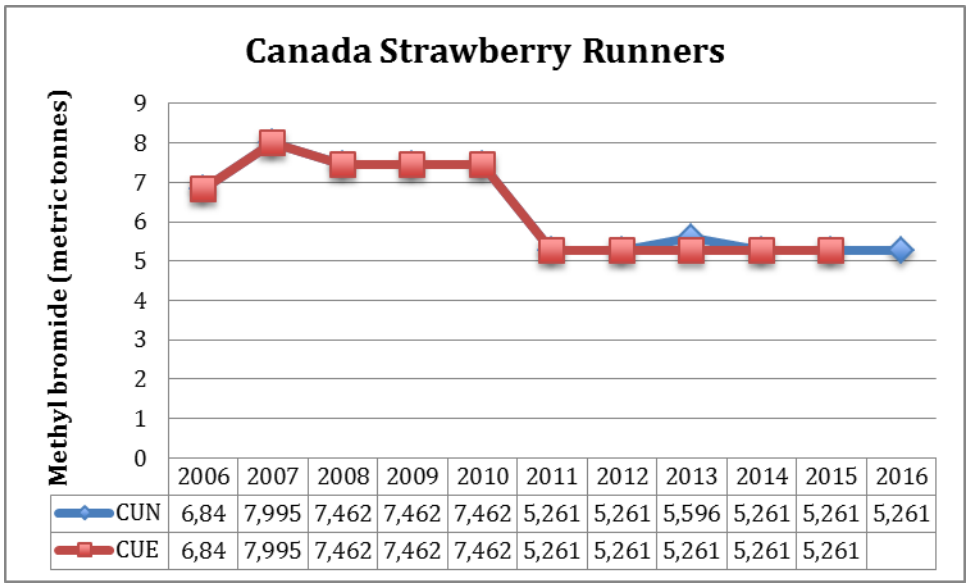
Party	Critical use exemption authorized by MOP for 2013	Quantity of MB as reported by Parties (metric tonnes)				
		Amount on hand at start of 2013	Quantity acquired for CUEs in 2013 (production +imports)	Amount available for use in 2013	Quantity used for CUEs in 2013	Amount on hand at the end of 2013
Australia	32.134	0	31.521	31.521	31.521	0
Canada	13.109	0.916	11.951	12.867	11.460	1.407
Japan	3.317	0.816	1.190	2.006	1.667	0.339
USA	562	?[(c)] 627[(a)]	562	1189	562	?[(c)] 357[(b)]

(a) Amount of pre-2005 stocks available at the start of 2013
(b) Amount of pre-2005 stocks available at the end of 2013
(c) Amount of post 2005 stocks are not reported

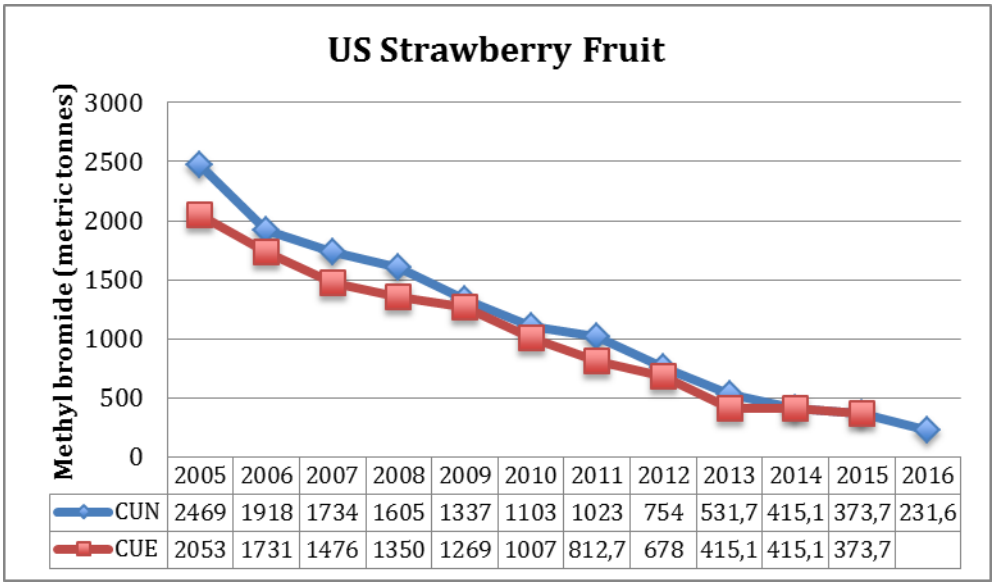
Figure 1-1. Amounts of MB nominated and exempted for CUE uses in nominated preplant soil sectors from 2005 to 2016. Blue lines indicate the trend in CUN MB nominated and the red lines the amount of CUE MB approved by the Parties



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CUN	35,75	35,75	35,75	35,75	29,79	29,79	29,79	29,79	29,76	29,76	29,76	29,76
CUE	35,75	35,75	35,75	35,75	29,79	29,79	29,79	29,76	29,76	29,76	29,76	

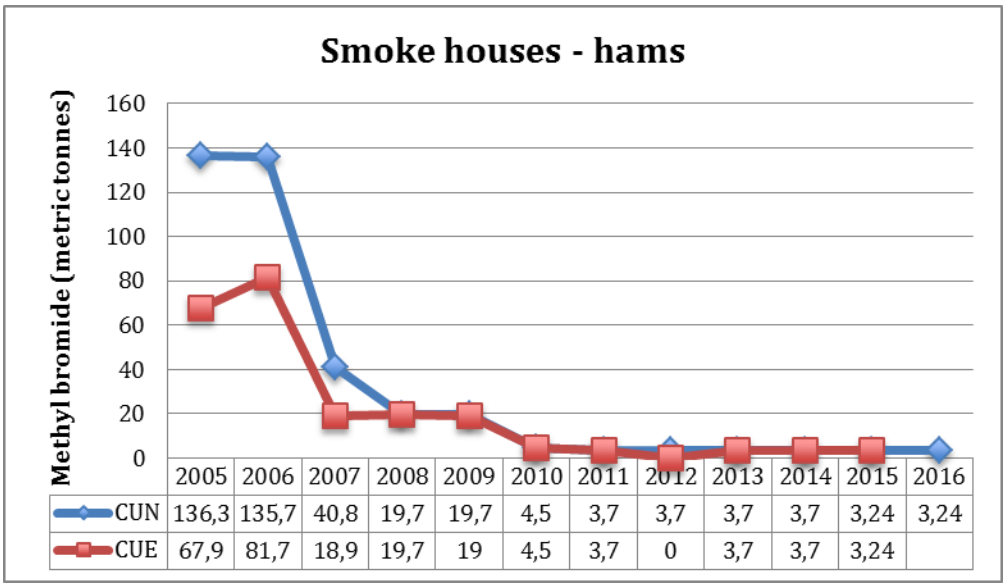


	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CUN	6,84	7,995	7,462	7,462	7,462	5,261	5,261	5,596	5,261	5,261	5,261
CUE	6,84	7,995	7,462	7,462	7,462	5,261	5,261	5,261	5,261	5,261	



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CUN	2469	1918	1734	1605	1337	1103	1023	754	531,7	415,1	373,7	231,6
CUE	2053	1731	1476	1350	1269	1007	812,7	678	415,1	415,1	373,7	

Figure 1-2. Amounts of MB nominated and exempted for CUE uses in dry cure pork (smokehouse hams) from 2005 to 2016. Blue lines indicate the trend in the CUN MB nominated and the red lines the amount of CUE MB approved by the Parties



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CUN	136,3	135,7	40,8	19,7	19,7	4,5	3,7	3,7	3,7	3,7	3,24	3,24
CUE	67,9	81,7	18,9	19,7	19	4,5	3,7	0	3,7	3,7	3,24	

Table 1-4. Summary of Critical Use Nominations and Exemptions of Methyl Bromide (tonnes)

	Quantities Nominated												Quantities Approved										Interim rec.
Party	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2005 (1ExMOP and 16MOP)**	**2006 (16MOP+ 2ExMOP+ 17MOP)**	**2007 (17MOP + 18MOP)**	**2008 (18MOP + 19MOP)**	**2009 (19MOP)**	**2010 (20MOP + 21MOP)**	**2011 (21MOP)**	**2012 (22MOP)**	**2013 (23MOP)**	**2014 (24MOP)**	**2015 (25 MOP)**	**2016**
Australia	206.950	81.250	52.145	52.900	38.990	37.610	35.450	34.660	32.164	30.947	29.79	29.79	146.600	75.100	48.517	48.450	37.610	36.440	28.710	31.708	32.134	30.947	29.79	[29.79]
Canada	61.992	53.897	46.745	42.241	39.115	35.080	19.368 +3.529	16.281	13.444	10.305	5.261	5.261	61.792	53.897	52.874	36.112	39.020	30.340 +3.529	19.368	16.281	13.109	10.305	5.261	[5.261]
EC[1]	5754.361	4213.47	1239.873	245.00	0	0	0	0	0	0	0	0	4392.812	3536.755	689.142	245.146	0	0	0	0	0	0	0	0
Israel	1117.156	1081.506	1236.517	952.845	699.448	383.700	232.247	0	0	0	0	0	1089.306	880.295	966.715	860.580	610.854	290.878	0	0	0	0	0	0
Japan	748.000	741.400	651.700	589.600	508.900	288.500	249.420	221.104	3.317	0	0	0	748.000	741.400	636.172	443.775	305.380	267.000	239.746	219.609	3.317	0	0	0
New Zealand	53.085	53.085	32.573	0	0	0	0	0	0	0	0	0	50.000	42.000	18.234	0	0	0	0	0	0	0	0	0
Switzerland	8.700	7.000	0	0	0	0	0	0	0	0	0	0	8.700	7.000	0	0	0	0	0	0	0	0	0	0
USA	10753.997	9386.229	7417.999	6415.153	4958.034	3299.490	2388.128	1181.779 + 6.339	691.608	442.337	377.170	234.78	9552.879	8081.753	6749.060	5355.976	4261.974	3232.856 +2.018	2055.200	993.706	562.328	442.337	377.170	[234.780]
Argentina	-	-	-	-	-	-	-	-	-	-	245		-	-	-	-	-	-	-	-	-	-	[0]	
China	-	-	-	-	-	-	-	-	-	--	120		-	-	-	-	-	-	-	-	-	-	[114]	
Mexico	-	-	-	-	-	-	-	-	-	-	140		-	-	-	-	-	-	-	-	-	-	[84.957]	
TOTALS	**18704.241**	**15617.837**	**10677.552**	**8297.739**	**6244.487**	**4044.380**	**2928.142**	**1460.163**	**740.533**	**483.589**	**917.191**	**266.561**	**16050.089**	**13418.200**	**9160.714**	**6990.039**	**5,254.838**	**3572.183**	**2343.024**	**1261.304**	610.888	483.589	412.221 + [198.957]	[266.561]

* Not yet available.

[1]Members of the European Community which had CUNs/CUEs included: 2005 – Belgium, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Spain, and the United Kingdom; 2006 – Belgium, France, Germany, Greece, Ireland, Italy, Latvia, Malta, Netherlands, Poland, Portugal, Spain, and the United Kingdom; 2007 – France, Greece, Ireland, Italy, Netherlands, Poland, Spain, and the United Kingdom; 2008 – Poland, Spain

1.3 Evaluations of CUNs – 2014 round for 2015 and 2016 exemptions

Parties requesting CUNs in 2014 sent information to the Ozone Secretariat generally by the January 24, deadline. The Secretariat forwarded them to MBTOC co-chairs, who in turn provided the information to MBTOC for their consideration for preliminary assessment to ensure information had been provided as per Decision IX/6 and Annex 1 of the 16th MOP. Where some evidence was missing, MBTOC requested further information of the Parties prior to the interim assessment. Detailed interim assessments of all CUNs were made by MBTOC at a meeting in Stellenbosch (South Africa) from March 31 to April 4 2014. The meeting was attended by twenty MBTOC members with expertise in soils, SC and QPS applications of methyl bromide. MBTOC worked as a single body, not in sub-committees. The three co-chairs appointed working groups to address the different tasks assigned to MBTOC including CUNs, but also others as included in its Progress Report. Recommendations were discussed and signed off in plenary and by consensus. Comments made by members not attending the meeting were considered during evaluations. This scheme allowed members with specific expertise to make contributions where they were most useful and for all the committee to fully participate in the decision making process.

During the meeting, MBTOC held a teleconference with the US delegation with participation of experts from the USA on alternatives for the ham sector. MBTOC also conducted a field visit to the Dept. Agriculture, Forestry and Fisheries Quarantine Station in Stellenbosch and two commercial field producers (a strawberry producer and a vegetable farm) who were still using methyl bromide. Pest control applicators and commercial growers that attended the meetings were surprised to hear that South Africa was reporting zero consumption and was concerned that this situation be rectified with the regulatory authorities in South Africa.

For soils CUNs, Australia and Canada submitted similar amounts to the previous rounds highlighting difficulties with phase out of MB for the strawberry runners sector in particular. In the USA the only soil CUN submitted was for strawberry fruit production.

With respect to A5 Parties, Argentina submitted CUNs for the strawberry fruit (open field), tomato and pepper sectors (protected), China for both protected and field production of ginger and Mexico for raspberry and strawberry runners produced in the open field.

For the postharvest sector only one CUN was received from the USA, for dry cure pork. Malaysia initially submitted a CUN for structures concerning flourmills, ship holds and aircraft fumigation, but later withdrew this nomination.

The total nominated amount for all countries for 2015 was 917.191 tonnes; of these, 412.191 t by non-A5 Parties (representing a 14.8% reduction with respect to the nominated amount in 2013 for 2015) and 505 tonnes by A5 Parties. For 2016, non-A5 Parties have nominated 315.005 tonnes, a reduction of 34.6% with respect to the previous year. MBTOC has recommended 198.957 tonnes for A5 Parties for 2015 and 266.561 tonnes for non-A5 Parties for 2016. The grounds used for these recommendations are given in detail for the relevant CUNs in Tables 1-9, 1-10 and 1-11.

In general the CUNs were submitted due to the following alleged issues: regulatory restrictions that did not allow partial or full use of alternatives, difficulties in the scale-up of alternatives and that all alternatives were considered uneconomical, insufficiently effective and/or were unavailable. In paragraph 20 of Annex 1 referred to in Decision XVI/4, Parties specifically requested that MBTOC explicitly state the specific basis for the Party's economic statement relating to CUNs. Tables 1-9, 1.10 and 1-11 provide this information for each CUN as prepared by the MBTOC economist. MBTOC notes the economic information supplied by the nominating Parties continued to improve in this round.

1.3.1 Critical Use Nominations Review

The meeting was held as required in accordance with the time schedule for the consideration of CUNs provided in Annex I referred to in Decision XVI/4. In considering the CUNs submitted in 2014, as in previous rounds, MBTOC applied as much as possible the standards contained in Annex I of the final report of 16 MOP, and, where relevant, the standard presumptions given below. In particular, MBTOC sought to provide consistent treatment of CUNs within and between Parties while at the same time taking local circumstances into consideration. The most recent CUE approved by the Parties for a particular CUN was used as baseline for consideration of continuing nominations, except in the case of A5 Parties, this being the first time that they have submitted CUNs. In that case, however, historical MB use provided with the nomination, was taken into account. In evaluating the CUNs for soil treatments, MBTOC assumed that the presence of a technically feasible alternative to MB would need to provide sufficient pest and/or weed control for continued production of that crop to existing market standards.

For commodity and structural applications, it was assumed that technically and economically feasible alternatives would provide disinfestation to a level that met the objectives of a MB treatment, e.g. meeting infestation standards in finished product from a mill. The outcome of evaluations of CUNs for the soil and structural treatments are presented in Table 1.9, 1.10 and 1.11 below.

1.3.2 Achieving Consensus

In accordance with decision XX/5(9) and similar subsequent decisions (XXI/11(4), XXII/6(4) and XXIII/4(3)) and XXIV/5 and 8 the Parties have indicated that MBTOC '*should ensure that it develops its recommendations in a consensus process that includes full discussion among all available members of the Committee and should ensure that members with relevant expertise are involved in developing its recommendations'*.

In keeping with recent Decisions as well as the new working scheme put in place by the co-chairs, all members were given access to the information and were able to discuss issues related to all nominations (either in person or by electronic means), but only those members able to physically participate in the meeting formed consensus. All views were discussed fully in plenary and issues debated until a consensus position was reached. No minority positions arose during the meeting

Several members recused from recommendations on nominations as required by MBTOC's working procedures. These included Jim Wells (US Strawberry Fruit, Mexican strawberry and raspberry runners, Argentina strawberry fruit and tomato and peppers), Alejandro Valeiro (Argentina strawberry fruit and tomato and pepper), Aocheng Cao (China ginger), Eduardo Willink (Argentina strawberry fruit and tomato and pepper) and Ian Porter (Australian Strawberry nurseries). The recusals took place either as a result of a member's disclosure as per MBTOC's guidelines or members may have chosen to self-recuse to avoid any perceived conflict of interest.

1.4 MBTOC Soils: Interim Evaluations of 2014 Critical Use Nominations for Methyl Bromide for 2015 and 2016

1.4.1 Critical Use Nomination Assessment

Table 1.5 identifies the quantities recommended by MBTOC after consideration of all the information provided by the Parties. In summary, the Australian, Canadian and US nominations were recommended in full as the Parties gave sufficient substantiation that alternatives were economically infeasible or impacted by regulatory issues. The USA has indicated this will be the last year they will submit a CUN for strawberry fruit. The Argentinean nominations were not recommended because MBTOC believes that alternatives, which are available and effective, could be used for the nominations and the Party did not provide information demonstrating that this is not the case under the particular circumstances of these nominations. The CUNs submitted by China and Mexico were only partially recommended after adjustments related to MBCTOC's standard presumptions or

because MBTOC believes that alternatives are available and effective for part of the nominations. In one case, the committee considered that contingency amounts were being requested for a future scenario and this was not supported. The detailed descriptions can be found in Table 1-5.

Table 1-5. Summary of the interim recommendations (in square brackets) for CUE's for preplant uses of MB (tonnes) submitted in 2014 for 2015 and 2016

Country and Sector	Article 5 Parties		Non A5 Parties	
	Nomination by Party for 2015	**Interim Recommendation for 2015**	**Nomination by the Party for 2016**	**Interim Recommendation for 2016**
1. **Australia**				
Strawberry runners			**29.760**	**[29.760]**
2. **Canada**				
Strawberry runners			**5.261**	**[5.261]**
3. **USA**				
Strawberry fruit			**231.540**	**[231.540]**
4. Argentina				
Tomato and pepper	**145**	**[0]**		
Strawberry fruit	**100**	**[0]**		
5. China				
Ginger, open field	**90**	**[90]**		
Ginger, protected	**30**	**[24]**		
6. Mexico				
Strawberry runners	**70**	**[43.539]**		
Raspberry runners	**70**	**[41.418]**		
TOTAL	**505**	**[198.957]**	**266.561**	**[266.561]**

1.4.2 Issues Related to CUN Assessment for Preplant Soil Use

Key issues which influenced assessment and the need for MB for preplant soil use of MB in the 2014 round were:

i) An increase in the chloropicrin dosage rate allowed in California was a key issue related to the further reduction made in the US nomination.

ii) Continued adoption of a new formulation of 1,3-D/Pic ('*Pic-Clor 60'*) in the USA, which increases the area that may be treated with 1,3-D in regions affected by township caps in California.

iii) More effective disease control obtained with shank applied fumigants than drip applied fumigants will influence the practices being adopted for existing and future CUE sector.

iv) The USA has indicated that this will be the last year that they will submit a CUN for strawberry fruit. Canada noted that it intends that 2016 is the final year for use of methyl bromide for strawberry runner production .

v) The Mexican raspberry and strawberry runner sectors developed recently and were incorporated into the MB phase-out project at a late stage. Only preliminary results from trials with alternatives are thus available at this time.

vi) The only chemical alternative available in China for ginger is chloropicrin. Initial results with this fumigant are encouraging, but time is needed to implement integrated control programs for the key pathogen *Ralstonia solanacearum*.

MBTOC has noted more specific issues related to requests for CUNs below and also in the CUN text boxes (Table 1.9).

1.4.3 General Comments on the Assessment for Preplant Soil Use

MBTOC continues to encourage Parties to consider a review of regulations covering the registration, use and adoption of alternatives, particularly those regarding barrier films to reduce dosage rates of MB and its alternatives, and associated emissions. MBTOC is aware that regulations now allow high barrier films (VIF) to be used with MB in California. MBTOC also notes that a large proportion of MB has been nominated for uses where regulations or legislation prevent reductions of MB dosage. For several cases, the mandatory use of MB is specified at a high dosage, in some cases for treatment of certified propagation material. Also regulations on the use of alternatives or lack of registration of them, are preventing their uptake for a substantial proportion of the remaining CUNs for preplant soil use.

1.4.4 Registration of Alternatives for Preplant Uses - Decision Ex I/4 (9i) and (9j)

Decision Ex. I/4 (9i) requires MBTOC, "*To report annually on the status of re-registration and review of methyl bromide uses for the applications reflected in the critical-use exemptions, including any information on health effects and environmental acceptability"*. Further, Decision Ex I/4 (9j) requires MBTOC "*To report annually on the status of registration of alternatives and substitutes for methyl bromide, with particular emphasis on possible regulatory actions that will increase or decrease dependence on methyl bromide".*

Where these have impacted a nomination, the party or MBTOC may have adjusted quantities to allow for effective use of the alternative. A description of any changes has been made available in the CUN text boxes (Tables 1.9 and 1.11).

Any future nominations submitted by Australia, Canada and the US should include information on expected rates of adoption of alternatives following registration, in accordance with paragraphs 34-35 of Annex 1 of the MOP16, as this information would assist MBTOC in its evaluation of these CUNs.

1.4.5. Decision XXV/4

In response to Decision XXV/4 from the 25th MOP, MBTOC notes that all of the non-A5 nominations contained a discussion of national, subnational or local regulations impacting the potential use of alternatives to MB. In addition, both Non-A5 and A5 nominations contained information on the status of the registration of alternatives and substitutes for MB. These comments are summarized below for each Party.

1.4.5.1 Regulations impacting use of alternatives by country

- **Australia:** Methyl iodide has been withdrawn by the registrant from Australia and is no longer available to the strawberry runner industry. BOC/Linde ceased funding research on Ethanedinitrile (EDN) for strawberry runners. Future development of EDN is uncertain. Nordiko is no longer pursuing registration of recaptured methyl bromide due to inconsistency of formulation. Meanwhile trials to generate registration data for an 80:20 mix of chloropicrin/1,3-D are underway. Australia has a certification program in place to assure the sanitation of strawberry runners. Only certain fumigants and rates are approved for use by the authorities. Three years of studies have not demonstrated bioiequivalency between 20g/m^2 of MB and standard rates of 25g/m^2, so registration of the lower rate is not proceeding. PicPlus®, while registered in Australia and part of an active research program, is not approved for use for certified runners at this time.

- **Canada:** Strawberry runners produced on Prince Edward Island are primarily exported to North Carolina in the USA. The runners must meet the phytosanitary requirements of Canada, the United States government and the North Carolina Department of Agriculture. Chloropicrin is still not permitted on Prince Edward Island and so is not available for use in strawberry runner production there. A protocol has been developed for a chloropicrin groundwater study.

Depending on the results of the study, chloropicrin may be allowed for use on PEI in the future. 1,3-D was de-registered in Canada after December 31, 2011. Re-evaluation of MITC generators is ongoing. A groundwater warning statement is currently on Canadian labels, which prevents the use of these products on PEI.

- **USA:** Allyl isothiocyanate (AITC) is registered as a preplant soil fumigant for several crops in the US in September, 2013.The registrant has expressed interest in registering AITC products in California, but has yet to submit an application. In accordance with California Department of Pesticide Regulation (CDPR) policy, a full risk assessment will be conducted prior to the registration of any new fumigants in California. CDPR has announced that there will no longer be exceptions to the 90,250 lb. township cap for 1,3-D products in high use strawberry townships, until the completion of an on-going risk assessment of 1,3-D, at which time a decision will be made whether to further limit or expand 1,3-D use in California.

- **China:** The only registered alternative to MB for ginger in China is chloropicrin and there are no mixtures of fumigants with chloropicrin registered, including MB.

- **Argentina:** Chloropicrin is not registered as a stand-alone product in Argentina, but combinations of 1,3-D/pic products are registered. Dazomet is not registered for edible crops.

- **Mexico:** Chloropicrin alone, 1,3-D/Chloropicrin mixtures, metham sodium and dazomet are registered in Mexico. Dimethyl disulfide (DMDS) is not registered in Mexico at this time.

1.4.5.2 Health effects of MB use and environmental acceptability

Over the past two decades numerous studies have characterized the health hazards resulting from exposure to methyl bromide. Its acute and chronic toxicities are very high and in many countries it is classified as "toxicity class I". It is known as a developmental, neurologic and respiratory toxin (Gemill *et al*., 2013, de Souza *et al*., 2013, Bulathsinghala *et al.,* 2014). Other known target organs are the heart, adrenal glands, liver, kidneys and testis (Gemill *et al*., 2013).

Accidental exposure to high concentrations of MB has been reported in many instances including fumigation of museums in Japan (Yamano and Nakadate, 2006), when handling the fumigant in a manufacturing facility in India (de Souza *et al*., 2013) and when opening imported freight containers (Baur *et al*., 2010).

Recent research findings suggest links between exposure to MB and health problems, including increased risk of developing prostate cancer, derived from occupational and community exposure (Budnik *et al*., 2012, Alavanja *et al*., 2013, Cockburn *et al.,* 2011). In another study (Gemill *et al*., 2013), a correlation was found between impaired foetal growth during the third trimester and exposure to methyl bromide in residential areas

Risk of exposure is especially high when small disposable canisters (i.e. 500 to 750g) are used for MB fumigation for pre plant soil under plastic sheets (Yamano *et al*., 2001). Canister applications have been eliminated for soil use in all non-Article 5 and in many A5 countries as this application is considered to be less efficient than other methods for the control of soil borne pathogens. Besides, this treatment is considered to be more dangerous to workers than injection methods, because trained contractors are not generally involved in MB application. This practice is not considered as effective for pathogens' control as use of MB/Pic mixtures and also can lead to high emissions of methyl bromide as the gas is released immediately beneath the plastic sheets. MBTOC notes with concern that canister use is still allowed for preplant use and quarantine uses in a number of A5 countries e.g. China, Egypt Jordan, Mexico.

The environmental acceptability of methyl bromide is handled by national regulatory authorities in each country.

1.4.6 Sustainable Alternatives for Preplant Uses

MBTOC urges Parties to consider the long term sustainability of treatments adopted as alternatives to MB. The combination of chemical and non-chemical alternatives in an IPM program provides excellent results in the longer term. Decision IX/6 1(a)(ii) refers to alternatives that are '*acceptable from the standpoint of environment and health'*. MBTOC has visited various regions where successful non-chemical alternatives e.g. soil less culture, grafting, solarisation, steam, biodisinfestation and anaerobic soil disinfestation, are used as sustainable alternatives to MB. Several Parties consider these techniques as viable alternatives, particularly when an integrated approach that combines different options is adopted.

MBTOC recognizes the potential benefit of the recent establishment of a California DPR "Strawberry Non Fumigant Workgroup" to evaluate and adopt further chemical and non-chemical technologies such as: anaerobic soil disinfestation; soilless substrate systems and steam (CalDPR, 2013).

1.4.7 Standard Presumptions Used in Assessment of Nominated Quantities.

The tables below (Tables 1-6 and 1-7) provide the standard presumptions applied by MBTOC for this round of CUNs for preplant soil uses. These standard presumptions were first proposed in the MBTOC report of October 2005 and were presented to the Parties at 17th MOP. Studies and reports to support them have been provided in previous reports and were revised for some sectors after consideration by the Parties at the 19th MOP. The rates and practices adopted by MBTOC as standard presumptions are based on maximum rates considered acceptable by published literature and actual commercial practice.

As in the evaluations in previous years, MBTOC considered reductions to quantities of MB in particular nominations to a standard rate per treated area where technical evidence supported its use. As a special case, MBTOC continues to accept a maximum rate of 200 kg/ ha (20 g/m^2) in MB/Pic formulations with high Pic-containing mixtures with or without barrier films for certified nursery production, unless regulations prescribe lower or higher rates. However, MBTOC notes that studies have shown that rates of 200 kg/ha (20g/m^2) or less of MB: Pic 50:50 are effective with barrier films for production of 'certified' nursery material and urge Parties to consider regulations which permit these lower rates. MBTOC also notes that certified runner production may involve regulations which specify the mandatory use of a fumigant such as MB or an alternative, in order for the runners to be "certified runners".

The indicative rates used by MBTOC were maximum guideline rates, for the purpose of calculation only. MBTOC recognises that the actual rate appropriate for a specific use may vary with local circumstances, soil conditions and the target pest situation. Some nominations were based on rates lower than these indicative rates.

Table 1-6. Standard Presumptions Used in Assessment of CUNs for Preplant Soil Use of MB

	Comment	CUN adjustment	Exceptions
1. Dosage rates	Maximum guideline rates for MB:Pic 98:2 are 25 to 35 g/m^2 with barrier films (VIF or equivalent); for mixtures of MB/Pic are 12.5 to 17.5 g MB/m^2 for pathogens and nutsedge respectively, under barrier films depending on the sector. All rates are on a 'per treated hectare' basis.	Amount adjusted to maximum guideline rates. Maximum rates set dependent on formulation and soil type and film availability.	Higher rates accepted if specified under national legislation or where the Party had justified otherwise.
2. Barrier films	All treatments to be carried out under low permeability barrier film (e.g. VIF, TIF)	Nomination reduced proportionately to conform to barrier film use.	Where barrier film prohibited or restricted by legislative or regulatory reasons
3. MB/Pic Formulation: Pathogens control	Unless otherwise specified, MB/Pic 50:50 (or similar) was considered to be the standard effective formulation for pathogen control, as a transitional strategy to replace MB/Pic 98:2.	Nominated amount adjusted for use with MB/Pic 50:50 (or similar).	Where MB/Pic 50:50 is not registered, or Pic (Pic) is not registered
4. MB/Pic Formulation: Weeds/nutsedge ass control	Unless otherwise specified, MB/Pic 67:33 (or similar) was used as the standard effective formulation for control of resistant (tolerant) weeds, as a transitional strategy to replace MB/Pic 98:2.	Nominated amount adjusted for use with MB/Pic 67:33 (or similar).	Where Pic or Pic-containing mixtures are not registered
5. Strip vs. Broadacre	Fumigation with MB and mixtures to be carried out under strip	Where rates were shown in broad acre hectares, the CUN was adjusted to the MB rate relative to strip treatment (i.e. treated area). If not specified, the area under strip treatment was considered to represent 67% of the total area.	Where strip treatment was not feasible e.g. some protected cultivation, emission regulations on MB, or open field production of high health propagative material

Table 1-7. Maximum dosage rates for preplant soil use of MB by sector used since 2009 (standard presumptions).

Film Type	Maximum MB Dosage Rate (g/m^2) in MB/Pic mixtures (67:33, 50:50) considered effective for:			
	Strawberries and Vegetables	**Plant Nurseries***	**Orchard Replant**	**Ornamentals**
Barrier films - Pathogens	12.5	15	15	15
Barrier films – Nutsedge	15.0	17.5	17.5	17.5
No Barrier films – Pathogens	20	20	20	20
No Barrier films - Nut sedge	26	26	26	26

* Maximum rate unless certification specifies otherwise

1.4.8 Adjustments for Standard Dosage Rates using MB/Pic Formulations

As in previous assessments, one key transitional strategy to reduce MB dosage has been the adoption of MB/Pic formulations with lower concentrations of MB (e.g. MB/Pic 50:50, 33:67 or less). These formulations are considered to be equally as effective in controlling soilborne pathogens as formulations containing higher quantities of MB (e.g. 98:2, 67:33) (Porter *et al.*, 2006; Santos *et al*., 2007; Hamill *et al.*, 2004; Hanson *et al.*, 2006). MBTOC notes that reported use of MB/Pic formulations in the US shows that formulations with greater amounts of MB (CalDPR, 2012a) are still being used in California and the Party is urged to consider even lower dosage rates of MB for the remaining CUN. This includes rates as low as 75 kg/ha (7.5 g/m^2) with mixtures of 30:70 or 33:67 mixtures (at 250 kg/ha or 25 g/m^2) or 100 kg/ha (10 g/m^2) of MB in 250 kg/ha (25 g/m^2) of 50:50 MB/Pic mixtures in conjunction with barrier films (Table 1-8).

Table 1-8. Actual dosage rates applied during preplant fumigation when different rates and formulations of MB/Pic mixtures are applied with and without barrier films. Rates of application reflect standard commercial applications rates.

Commercial application rates (kg/ha) of MB/Pic formulation	**MB/Pic formulation (dose of MB in g/m^2)**			
	98:2	**67:33**	**50:50**	**30:70**
A. With Standard Polyethylene Films				
400	39.2	26.8	20.0	12.0
350	34.3	23.5	17.5	10.5
300	29.4	20.1	15.0	9.0
B. With Low Permeability Barrier Films (LPBF)				
250	24.5	16.8	12.5	7.5
200	19.6	13.4	**10.0***	6.0
175	17.2	11.8	8.8	5.3

** Note: Trials from 1996 to 2008 (previous CUN reports) show that a dosage of 10g/m^2 (e.g. MB/Pic 50:50 at 200kg/ha with low permeability barrier Films) is technically feasible for many situations and equivalent to the standard dosage of >20g/m^2 using standard PE films*

1.4.9 Use/Emission Reduction Technologies - Low permeability barrier films and dosage reduction

Decision XXI/11 (para 9) requested further reporting on Decision IX/6 to ensure Parties adopted emissions controls where possible. For preplant soil use, this includes the use of barrier films or other mitigation strategies such as high moisture sealing and the lowest effective dose of MB with mixtures of chloropicrin. Other methods include deep shanking and use of ammonium thiosulphate and different irrigation technologies (Yates *et al.*, 2009). These latter technologies have not been reported or adopted widely by Parties.

In southeast USA the reported use of barrier films in vegetable crops, which expanded rapidly to over 20,000 hectares in 2009 has continued to increase. A recent change in the regulations – presently allowing use of VIF in California - should lead to an increase in the adoption of barrier films in that State. MBTOC notes that barrier films particularly more recently developed totally impermeable (TIF) films can be used with alternatives and this is consistently improving the performance of alternatives at lower dosage rates (Driver *et al*. 2011; Fennimore and Ajwa, 2011)]. Effectiveness at lower dosages can allow for greater areas to be treated with 1,3-D under township cap regulations.

As of December 1, 2012, EPA issued new set of soil fumigant product label changes, implementing important new protections for workers and bystanders. In the frame of these changes, the State of California now allows the use of VIF films for fumigation with MB, which were formerly prohibited (Cal DPR, 2012b & c; EPA, 2013). MBTOC is at this time unclear on the impact this change could have in terms of potential reduction of dose rates of MB and emission control. Studies continue to show the advantages of barrier films and other technologies for reducing emissions and improving efficacy of alternatives as well as MB (Quin *et al*. 2013; Chellemi *et al*. 2013).

Table 1-9. Interim evaluation of CUNs from non A5 Parties for preplant soil use submitted in 2014 for 2016

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014 [10]	CUE for 2015[11]	CUN for 2016	MBTOC interim rec for 2016
Australia	Strawberry runners	35.750	37.500	35.750	35.750	29.790	29.790	29.790	29.760	29.760	29.760	29.760	29.760	[29.760]

MBTOC interim recommendation for 2016:

MBTOC recommends 29.760 tonnes for MB use in this sector in 2016. This is on the understanding that funding for research has been restored and efforts to find alternatives continue. MBTOC notes that mixtures of existing fumigants, and new formulations of fumigants with PIC (i.e.TF80 and TF60), are being trialled, and if effective, expect these to be adopted and registered.

Nomination by the Party for 2016:

The quantity requested for this CUN is 29.760 tonnes, an amount that has remained unchanged for this industry since 2009.

Circumstances of the nomination by the Party:

The Party states that the key pests affecting strawberry runner production are fungi (*Phytophthora, Pythium, Rhizoctonia* and *Verticillium spp*.) and weeds (*S. arvensis*, *Agrostistenuis sp, Raphanus spp*., *Poa annua, Cyperus spp*). The nomination is based on a particular soil and temperature situation: very high clay and organic matter content soils requiring fumigation treatments under cold temperatures.

In its CUN the Party argues that runner production in these kind of conditions, treated with MB:Pic (50:50 at a MB dose of 25 g/m^2) is needed to meet the certification standards. The Victorian runner industry only produces runners in soils treated with MB:Pic, and is not using any other methods other than substrates for the foundation stock production stage . Some non-chemical alternatives are not feasible. Plant resistance is unreliable as an alternative to MB:Pic for delivering certified runners (Fang *et al*. 2012). Integrated soil disinfestation with combinations of existing, registered fumigants is now considered the most likely and quickest approach for delivering a viable alternative to MB for the runner industry.

Although MB rates used exceeds MBTOC's standard presumption of 20 g/m^2, the lower rate is still unregistered in Australia. According to the Party, three years of trials with lower MB rates do not support bioequivalency of these rates.

The Party insists that soil-less systems are not yet technically and economically feasible for adoption into generations beyond the foundation stock.

A significant change since the last nomination is the fact that in December 2013, the federal government agency, Horticulture Australia Limited, confirmed co-funding for a new 3-year research program into MB alternatives for strawberry runners.

MBTOC interim assessment for MB use in this sector in 2016:

MBTOC acknowledges that the Party has provided an economic analysis supporting their assertion that the expansion of the use of soilless substrates beyond the foundation stock is not economically feasible.

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014 [10]	CUE for 2015[11]	CUN for 2016	MBTOC interim rec for 2016
	The nomination indicates that funding for the R&D program has been confirmed in 2013, so the Party is back in accordance with Decision IX/6 (b) (i) and (iii). MBTOC notes that the Party is required to report the available results of its research programme to the Technology and Economic Assessment Panel for its consideration to the 36th OEWG as per Decision XXV/4. While MBTOC once more recognizes the Party's past efforts in research and development of MB alternatives (Mattner, 2012), these efforts have not resulted in significant commercial uptake of alternatives. Furthermore, there have been essentially no significant reductions made for this production region since 2005 and no reduction in use rate as this is regulated by certification rules. MBTOC is aware that soilless production is technically suitable for at least some part of the nomination, as it is in other parts of the world i.e. Belgium (Robe 1997, 1998), Poland (Trader *et al*. 2007), France (Hennion *et a*l. 1997) and A5 countries e.g. Brazil (Janisch *et al*. 2012, Oliveira *et a*l. 2010), Uruguay (Giménez *et al*. 2008), and Paraguay (Nacimiento and Lopez- Medina, 2009). The nomination ratifies that industry does not consider further expansion of soil-less systems for the production of mother and certified runners as it is considered economically infeasible and reports technical problems on the foundation generation. MBTOC still considers that soil-less culture is a technique used widely throughout the world for production of strawberry runners and is technically and economically suitable for some of the certified nursery production system as well as stock plants resulting in healthy nursery material (López-Galarza *et al*., 2010, Rodríguez-Delfín, 2012). MBTOC notes that after more than eleven years there is no action plan to phase out MB for this sector. **MBTOC comments on economics in 2014 for 2016:** • A comprehensive economic analysis shows that while foundation stock can be done in a soil-less system, Mother and Certified stock cannot. The selling prices of Mother and Certified stock would have to increase almost 7 fold (from A$0.34 per runner to A$2.03 and A$2.00 per runner respectively to break even. • Both operating and capital costs are about five times higher with a soilless system than open field production. • The main reason is the capital cost of setting up the soilless system and a yield loss of around 18%. Prices are assumed to stay the same for the two procedures. • These differences do not include the compliance costs with municipal regulations, or the costs of waste treatment, but note that the costs of use of methyl bromide do not include the real cost of damage to the ozone layer. • Soilless systems are more labour intensive, and labour costs in Australia are very high. With MB/Pic pre-plant soil treatment harvesting is done by machine, while with a soilless system it will be done by hand. The additional labour cost is already included in the operating costs and is a large reason for the difference in operating costs. **Comments Requested in Dec. XX1/11 (para 9):** • **Dec. IX/6 b(i) Emission Reduction**: No, but the Party states that standard films perform the same as VIF for the reduction of emissions in the cold temperatures and heavy wet soils typical for strawberry runner production in Victoria. Party also states that use of VIF did not improve the efficacy of reduced rates of MB to an acceptable level for the strawberry runner industry. • **Dec. IX/6 b(iii) Research Program**: An approved and funded research program is currently in place at the time of this nomination. • **Dec. IX/6 b(iii) Appropriate Effort**: Research effort is adequate - funded research program currently in place at the time of this nomination													

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014[10]	CUE for 2015[11]	CUN for 2016	CUE for 2016
Canada	Strawberry runners (PEI)	6.840	6.840	7.995	7.462	7.462	7.462	5.261	5.261	5.261	5.261	5.261	5.261	[5.261]

MBTOC interim recommendation for 2016:

MBTOC recommends the nominated amount of 5.261 tonnes for use in this sector in 2016. MBTOC notes that the Party in its response to questions noted that it intends that 2016 is the final year for use of methyl bromide for strawberry runner production in Prince Edward Island, although this might depend on the outcomes of the Pic 100 groundwater study.

Nomination by the Party for 2016:

The Party has nominated 5.261 t of MB, which was similar to the CUE granted for 2015 and the previous year's CUEs since 2011. It is for use for multiplication on runners on 26.3ha of land, which includes the two final stages of multiplication of plants exported from PEI. The nomination is based on a reduced rate of MB of 20 g/m² under high barrier films for the entire fumigated area (26.3 ha) which is consistent with MBTOC's standard presumptions.

Circumstances of the nomination by the Party:

The Party has attempted to replace MB with 1,3-D in the past, but it was banned for use in Prince Edward Island in January 2003 due to ground water contamination. Chloropicrin (PIC 100) is registered, but the PEI authorities have denied a permit for its use until further groundwater testing has been conducted. Long awaited studies on potential groundwater contamination of Pic 100 have finally been commenced in December 2013 and are anticipated to continue for two years. The Party is however required to report preliminary results to the 36th OEWG as per Decision XXV/4. The company at PEI has tested organic production from 2006 - 2009 with different varieties, but found that significant reductions in yield resulted, ranging from 40% to 70%. Only one variety using the organic production system compared favourably to conventional production. MB:Pic 67:33 at 500 kg/ha is the only formulation and rate registered for use in strawberry runners in PEI, and although this exceeds MBTOC's standard presumption of 200 kg/ha, the grower petitioned PMRA to use a lower rate under barrier films. PMRA, in the absence of a formal label amendment, granted permission to use a lower rate, but at the grower's own risk and liability. The CUN for 2016 is based entirely on a reduced rate for MB of 200 kg/ha for the entire critical area (26.3 ha).

The Party noted that at this time greatest effort is concentrated on the groundwater study with chloropicrin, as it is currently considered the most feasible alternative for the grower. The Party has also sought advice on soilless systems to reduce dependency on chemical fumigants.

MBTOC interim assessment for MB use in this sector in 2016:

After thorough review of the information provided by the Party, MBTOC now understands that the use of micro-propagated plants from USA and the scale up into soilless substrates for the first stage of multiplication of runners at PEI to produce approximately 60,000 runners have replaced or avoided the use of methyl bromide in stages for which MBTOC believes there are effective alternatives. The nomination is requesting MB for the final two multiplication stages. Canada considers the first stage of this field production and multiplication as foundation stock, however this is different nomenclature to other countries and this has caused some confusion in past years. Whilst soilless production is technically feasible for the later stages of production, MBTOC agrees from the information on economics that the use of soilless culture for the remaining runners is uneconomical and impractical. For this reason MBTOC agrees with the Party that the focus should be to find suitable alternatives for soil disinfestation and urges the Party to complete the groundwater studies to adopt chloropicrin either alone or in combination with other alternatives as soon as possible. MBTOC notes that metam sodium, metam potassium and

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014[10]	CUE for 2015[11]	CUN for 2016	CUE for 2016
	dazomet are also registered in Canada and could be considered for use in PEI under permit. MBTOC suggests that future programs for runners at PEI consider these alternatives as it is unclear from the nomination whether these products are being considered as replacements to MB at PEI. MBTOC requested a copy of the review conducted by Canada on soilless production systems, but this has not been provided. This is important, particularly as soilless systems are evolving rapidly and future systems may be more economical. MBTOC also notes that MB formulations containing Pic (67:33) are used in PEI under permit without groundwater contamination apparently occurring and suggests a similar situation should be possible for Pic alone, which is not currently permitted. **MBTOC comments on economics in 2014 for 2016:** While the CUN is submitted on technical grounds, an economic argument is provided in response to MBTOC´s recommendation of a 50% transition to soilless culture as a technically feasible alternative. Such a transition would imply high capital costs, but at a very small reduction (8%) in the required amount of MB. Production cost under the current practice is $0.135 per second generation plants. Total cost under a soilless system is $0.425 per second generation plant. Revenues stay the same as the price is the same (no improvement in quality is expected) and yields are not assumed to decline (unlike the Australian case). While MBTOC has recommended a cheaper soilless system, the party finds that the Australian alternative recommended by MBTOC is three times more expensive than the Haygrove system analysed in the CUN and therefore is still uneconomic. **Comments requested in Dec. XX1/11 (para 9)** • **Dec. IX/6 b(i) Emission Reduction:** Yes, uses barrier films with a reduced application rate of MB conforming to MBTOC's presumptions • **Dec. IX/6 b(iii) Research Program:** A research program is proposed based on groundwater studies for Pic, a review has been conducted on the evaluation of soilless methods to improve feasibility and consideration of improvements in the production processes. • **Dec. IX/6 b(iii) Appropriate Effort:** The Party has demonstrated now that it is engaged in an active research program and is implementing groundwater studies. The party has also engaged a consultant to assist with full evaluation of any potential alternatives to MB.												

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014[10]	CUE for 2015[11]	CUN for 2016	CUE for 2016
United States	Strawberry (field)	2052.846	1730.828	1476.019	1349.575	1269.32	1007.477	812.709	678.004	461.186	415.067	373.660	**231.540**	**[231.540]**

MBTOC interim recommendation for 2016:

MBTOC recommends the nominated amount of 231.540 tonnes for use in this sector for 2016. MBTOC acknowledges that the Party reduced the nomination by 38% from the amount approved for 2015. MBTOC also acknowledges the Party´s statements, which align with Decision XXV/4, that this will be the final nomination for this sector in order to complete its intended transition from critical uses for methyl bromide by the end of 2016.

Nomination by the Party for 2016:

The Party nominated 231.540 t of MB for use in 2016 on 1,362 ha at a dosage rate of 170 kg/ha. The Party indicated that the proportion of total crop area to be treated with MB was 9.0%.

Circumstances of the nomination by the Party:

The CUN requests MB specifically for areas: 1) where a transition period is needed for the use of broadcast 100% chloropicrin in fields with high pest pressure, in particular, with *Macrophomina* and *Fusarium* and 2) where 1,3-dichloropropene (1,3-D) is limited by township caps.

MBTOC interim assessment for MB use in this sector in 2016:

MBTOC agrees with the Party that alternatives are available for this nomination and respectfully acknowledges the Party has stated that this is the final year for transition. MBTOC endorses that alternatives are available for 100% of the nomination and notes that a recent meta-analysis in this sector supports this and previous findings (Belova *et al*., 2013, Porter *et al*., 2006). MBTOC also acknowledges the industries push to find more sustainable non chemical alternatives as reported recently by Fennimore *et al*., 2013. Key chemical alternatives include shank applied 1,3-D/Pic as well as other similar Pic mixtures, Pic alone or Pic in sequential application with MITC generators (KPam, Vapam, Dazomet) coupled with disease tolerant varieties of strawberries would be suitable to address a significant proportion of one or more of the 3 issues raised by the Party as a reason for the nomination (Belova *et al*., 2013, Medina-Minguez 2012, Noling and Cody 2011, Porter *et al.*, 2006, Zveibel *et al.*, 2012). MBTOC also notes that formulations with chloropicrin are the key chemical alternative effectively adopted in other regions of the world. MBTOC notes that the Party has accepted that the technical expertise required for application of 100% chloropicrin already exists in California and uptake of this method will be feasible by the end of 2016.

MBTOC also notes that as of December 1, 2012, a new set of label changes went into effect for soil fumigant products, fully implementing important new protection for workers and bystanders. In light of these changes, the State of California now allows the use of barrier films (VIF and TIF) for MB fumigation, which was formerly prohibited (Cal DPR, 2012b & c; EPA, 2013). Studies continue to show the advantages of barrier films and other technologies for reducing emissions and improving efficacy of alternatives as well as MB (Qin *et al.,* 2013; Chellemi *et al.,* 2013; Luo *et al.*, 2013) and anticipate that the Party will continue to consider their adoption where feasible for this sector, either with the remaining MB use or with alternatives to minimise the environmental and health effects of their use as required in Decision XXV/4.

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014[10]	CUE for 2015[11]	CUN for 2016	CUE for 2016
	MBTOC comments on economics in 2013 for 2015: • The CUN is based on the need for a transition period to move to 100% chloropicrin and regulatory (township cap) issues. • Economic data are provided and show that steam and chloropicrin b0oth result in net revenues that are slightly higher than that of methyl bromide application • Total phase-out is planned for the 2017 season **Comments Requested in Dec. XX1/11 (para 9):** • **Dec. IX/6 b(i) Emission Reduction:** In California (high barrier) films are now allowed for use with MB and with alternatives and although they appear not to be used with MB, rates are below MBTOC's standard presumptions. Further emission reduction may be possible with their adoption for any remaining uses of MB. • **Dec. IX/6 b(ii) Research Program:** Yes, there is an ongoing research program, but specific data justifying CUN requests need to be provided. • **Dec. IX/6 b(iii) Appropriate Effort:** California has extensive research programs being conducted and continual regulatory reviews on the use of MB and other fumigant alternatives in the State. MBTOC is unaware from the CUN application what efforts are being made to register some alternatives registered and being used in other areas of the USA (eg. Pic-Clor 60 and 80, DMDS in combination with Pic).													

[1]1ExMOP and 16MOP; [2]16MOP+2ExMOP+17MOP; [3]MOP17+MOP18; [4]MOP18+MOP19; [5]MOP19+MOP20; [6]MOP20+MOP21; [7]MOP21+MOP22; [8]MOP22, [9]MOP23, [10]MOP24,[11]MOP25

Table 1-10 Interim evaluation of CUNs from A5 Parties for preplant soil use submitted in 2014 for 2015.

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
Argentina	Tomato and Pepper	145	[0]											

MBTOC interim recommendation for 2015:

MBTOC does not recommend this nomination for 2015.

Nomination by the Party for 2015:

MBTOC does not recommend 145 tonnes of methyl bromide nominated by Argentina for critical uses for tomato and pepper production in protected cultivation in the critical regions of Mar del Plata and La Plata. MBTOC requested disaggregation of this CUN (separate nominations for tomatoes and peppers) but the Party explained that this is not possible as these two crops are grown simultaneously or sequentially on the same land and fumigation applies to both. The key pests are nematodes, fungi (*Rhizoctonia, Sclerotinia, Phytophthora spp.*), and weeds (*Cynodon* and *Cyperus spp*.). Rates of MB vary between 350 kg/ha to 500 kg/ha and MB/Pic70:30 formulations are used.

Circumstances of the nomination by the Party:

The Party states that 1,3-D/Pic does not provide sufficient control of key pests in the critical areas, mainly due to soil types, which are heavy clay soils and soil temperatures (5 to 23C). Chloropicrin is not registered alone and does not control weeds. Metam sodium shows erratic and insufficient performance for weed and disease control most possibly also due to soil type and weather conditions. Dazomet is not registered for edible crops and does not control nematodes. Steam boilers are not commercially available and are costly. Steam was trialled as an alternative through the MLF funded projects and found to be efficient but economically infeasible.

MBTOC interim assessment for MB use in this sector in 2015:

The Party has not provided substantiation to support its claim that 1,3-D/Pic or other alternatives (ie metam sodium) are not effective under the particular circumstances of the nomination. 1,3-D/Pic is reported as a successful alternative in some regions of Argentina (Agüero y Borquez 2007; Adlercreutz, E.G.A. y A. Szczesny, 2010), however no evidence of its lack of efficacy in the critical areas relating to the nomination was provided. MBTOC was unable to recommend without this information. Trials and results showing that non-chemical alternatives are not technically or economically feasible have also not been provided. MB also notes that the dose rate used by the Party appears to be 24.5 to 35.0 g/m^2 (350 to 500 kg/ha) and this exceeds MBTOC's standard presumptions for these crops.

MBTOC notes that the Party has been supported by the MLF with 2 demonstration and 4 technical assistance projects since 1997 and that many alternatives have been trialled (MLF, 2014a). The funding received from the MLF also supported two investment projects (one consisting of six tranches), which committed the Party to phase out its whole MB consumption for controlled uses by the end of 2014 (MLF 2014 ab).

Different types of alternatives have been adopted to replace MB in tomatoes and peppers in many developed and developing countries around the world, in different climates and soil types. For example, grafting tomatoes and peppers onto resistant rootstocks is effective and in use in many A5 countries such as China, Egypt, Lebanon, Mexico, Morocco, Romania, Tunisia and Turkey (MBTOC, 2011). The Party acknowledges that grafting is a promising alternative and has conducted preliminary trials with excellent results, when combining grafted plants and biofumigation (Garbi *et al*. 2013). 1,3-D/Pic is reported to provide excellent results and has been adopted as a key alternative in many countries (MBTOC, 2011). The performance of metam sodium has been shown to be enhanced when applied with a spading machine (Slusarski *et al.,* 2012)

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	MBTOC comments on economics in 2014 for 2015: The CUN assumes a substantial yield reduction in both tomatoes and peppers while prices and costs remain the same for both treatments (MB and the alternative) for both crops. Revenue reduction of 28% results from the use of alternatives. The reduction in revenue is partly due to a smaller drop in yield on the early crop, but mostly due to the impossibility of a late crop because of the waiting time between applications and planting. **Comments requested in Dec. XX1/11 (para 9)** • **Dec. IX/6 b(i) Emission Reduction:** Low impermeable films are not adopted but have been trialled through the projects • **Dec. IX/6 b(iii) MLF Assistance/Adoption of Effective Alternatives:** Trials and research have been conducted through the MLF projects implemented in Argentina and also directly by INTA (Argentinean Institute of Agriculture) and various universities. No reference related to the research in Argentina was provided with the nomination. **Dec. IX/6 b(iii) Appropriate Effort:** MBTOC assumed considerable research has been conducted during the MLF funded projects but was unable to assess the research effort as no references or reports were provided of local R and D.												
Argentina	Strawberry Fruit	100	[0]											
	MBTOC interim recommendation for 2015: MBTOC does not recommend this nomination. **Nomination by the Party for 2015:** The Party nominated 110 tonnes of methyl bromide for a critical use for strawberry fruit on 1,000 ha, which represents a MB rate of 110 Kg/ha. This rate is lower that the reported used rates (350-500 Kg/ha) in three key production regions, (Lules, Mar del Plata, Buenos Aires). The key pests are fungi (*Phytophthora*, *Verticillium*, *Fusarium)*, and weeds (*Cyperus)*. MB rates vary between 350 kg/ha to 500 kg/ha and a 70/30 formulation is used. **Circumstances of the nomination by the Party**: The Party states that 1,3-D/Pic does not control the entire pest spectrum and that metam sodium provides erratic results. According to the Party, challenges to the adoption of alternatives are mainly related to low soil temperatures and heavy rainfall at the time when fumigation needs to be performed. Chloropicrin alone is not registered and does not control weeds. Dazomet is not registered for edible crops. Steam was evaluated as an alternative through various projects and was found to be technically effective but unsuitable for large, open field areas and economically infeasible. **MBTOC interim assessment for MB use in this sector in 2015:** MBTOC requested clarification from the Party on soil temperatures and these were provided. In the absence of further information from the Party, the range of temperatures provided, 6-23º C, are not considered by MBTOC low enough to impact performance of fumigants such as 1,3-D/Pic. Further, the Party has not provided any additional information to substantiate that 1,3-D/Pic or other alternatives (ie metham sodium) are ineffective under the particular circumstances of the nominated areas. MBTOC was unable to												

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	recommend without this information. 1,3-D/Pic is reported as a successful alternative for strawberry in other regions of Argentina (Del Huerto-Sordo, 2013). No evidence of lack of effectiveness in the critical areas related to the nomination was provided, however MBTOC found references indicating positive results with alternatives such as metam ammonium, 1,3-D/Pic, metam sodium and metam potassium in the critical regions (Jaldo *et al.,*2007; INTA, 2008; 2007; Bórquez *et al.,* 2007; Aguero and Bórquez, 2007; Bórquez y Mollinedo, 2009, 2010; Adlercreutz and Szczesny, 2008, 2010). Trials with soil-less culture in the same sector have shown encouraging results in Tucuman (Villagra *et al*., 2012). MBTOC is unclear why these results have not been transferred to the regions nominated. MBTOC notes that the Party has been supported by the MLF with 2 demonstration and 4 technical assistance projects since 1999 and that many alternatives have been trialled (MLF, 2014a). The funding received from the MLF also supported two investment projects (one consisting of six tranches), which committed the Party to phase out its whole MB consumption for controlled uses by the end of 2014 (MLF, 2014b). **MBTOC comments on economics in 2014 for 2015:** ***For the Mar del Plata region:*** • Assumes a yield reduction from 93 to 62 t/ha using 1.3-D + Pic because of heavy clay soils and low soil temperatures. • From the yield reduction calculates a decline in gross revenue of one third as prices are assumed to be the same for the two treatments. • Argues that operating costs for the two treatments are similar, but these are not shown. However, the CUN then contradicts and argues that weed control costs of 1.3-D Pic would be greater than for methyl bromide, as will conversion to a one year production system. In this case yields are still assumed to be lower (15-20%) and the costs of fumigants, tarps and transplants will be higher. However, these costs are not given. ***For the Lules region:*** • Provides data on the movement in prices from the early harvest to late harvest. Prices start at $6/kg and end at <$1. • Argues that weed control is insufficient with 1.3-D Pic, that the planting time is short because of soil temperature and rainy conditions and prolonged plant back time. As a result, the strawberries miss the market window and are sold at the high-season price rather than the early-season price. • In this case, yield is expected to increase with 1.3-D Pic, but despite this, the fall in prices results in a loss in revenue of around 50%. • The “with methyl bromide” price is taken as $1.69/kg and the “with 1.3-D Pic” as $0.72/kg. • Again, costs of production are expected to be similar for the two treatments, in this case without the caveats. **Comments requested in Dec. XX1/11 (para 9)** • **Dec. IX/6 b(i) Emission Reduction:** Low impermeable films are available and have been trialled through the projects but are not yet adopted. A reference to lack of registration of TIF is made • **Dec. IX/6 b(iii) MLF Assistance/Adoption of Effective Alternatives:** Trials and research have been conducted through the MLF projects implemented in Argentina and also directly by INTA (Argentinean Institute of Agriculture) and various universities. No reference related to the research conducted in Argentina was provided with the nomination. • **Dec. IX/6 b(iii) Appropriate Effort:** MBTOC assumed considerable research has been conducted during the MLF funded projects but was unable to assess the research effort as no references or reports were provided by the Party of local R and D.													

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
China	Ginger Open	90	90											

MBTOC recommendation for 2015:

MBTOC recommends the requested amount of 90 tonnes of MB for this use in 2015.

Nomination by the Party for 2015:

China nominated 90 tonnes of methyl bromide for critical uses for open air ginger production on 229.59 ha at the rate of 40g/m^2 for use in 2015 .The target pests are, *Ralstonia solanacearum*, *Pythium* spp. *Meloidogyne* spp and *Cyperus rotundus*. MB is used in regions where soil-borne pathogen pressure is high and this only represents a small percentage (0.29%) of the total ginger area. The request is only for ginger grown in the Shandong region where ginger is grown continuously and where pressure from the target pests is high.

Circumstances of the nomination by the Party:

China is using small disposable canisters of MB (681 g/canister), using standard polyethylene films. MB is applied in canisters (98:2), as cold gas at a rate of 400 kg/ha, which is below the rate registered in China. According to the Party, chloropicrin is the only chemical alternative registered in China for this sector. Chloropicrin did not provide effective control of *Meloidogyne* spp and *Cyperus rotundus.* In addition, chloropicrin causes phytotoxicity and needs longer fumigation time obliging farmers to postpone the planting time which affects yield, quality and marketing. However a recent study confirms that chloropicrin is a promising alternative with good efficacy against *Ralstonia solanacearum*, which can be used successfully in integrated pest management programmes in China (Mao *et al*., 2014).

In spite of their proven efficacy, the other chemical alternatives, 1,3-dichloropropene, dazomet, iodomethane, metam sodium, dimethyl disulfide and sulfuryl fluoride are not registered for use on soilborne pathogens in this sector in China. SF however has been shown to control root-knot nematodes and to reduce the levels of key soil pathogens in research trials (Aocheng *et al*. 2014). Chloropicrin and 1,3 D have been formulated in capsules for trial work. Trials with Pic are encouraging (Mao *et al*., 2014). The tested 1,3-D/Pic capsule formulation provides a promising method for soil pest and disease control and reducing environmental emissions and potential human exposure in greenhouse vegetable cultivation (XiaoXue *et al.*, 2013). Telone C-35 is an excellent MB alternative and has provided acceptable weed control efficacy (XiaoXue *et al*., 2013), but this formulation is not registered.

According to the Party, non chemical alternatives (crop rotation, bio-fumigation, solarization, steaming) are not technically and economically feasible. Barrier films (VIF and TIF) are produced in China, but are not used for ginger production due to their high cost and low efficacy under low temperatures. MB is applied every year during early spring or late autumn.

MBTOC interim assessment for MB use in this sector in 2015:

MBTOC accepted the Party´s information that alternatives are not available for this nomination, particularly as 1,3-D is unavailable for use in China. MBTOC however notes that other countries which applied MB using canisters on a small scale basis have phased out for this sector (eg Japan). In China the registered MB application rate varies between 500 and 750 kg/ha (Aocheng, 2014). Although the amount requested is based on a use rate of 40g/m^2 (without VIF or TIF), the application is based on the use of canisters of MB which are less efficient than soil injection methods and thus the rate proposed is considered appropriate. This rate is higher than the rates used for ginger before in Japan , but the target pests in China, also include *Ralstonia* and nutgrass (*Cyperus*), which are more difficult to control. MBTOC considers that in the absence of effective alternatives MB/Pic

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	50:50 can be suitable for this sector, but China would need to develop technology to formulate and apply this formulation. MBTOC considers that barrier films should be used in future and urges the Party to consider accessing these films. MBTOC is also aware that chloropicrin combined with dimethyldisulphide or chloropicrin with fosthiazate have shown promising results (Aocheng, pers. comm.). MBTOC notes that the Party has been supported by the MLF with one demonstration project, three project preparation grants and one investment project consisting of eight tranches since 1994 and that many alternatives have been trialled. The funding received from the MLF was support for investment projects and committed the Party to phase out its whole MB consumption for controlled uses by the end of 2014 (MLF, 2014 ab). MB canisters are used because they provide small-scale farmers with an easy application method and the ability to apply targeted amounts of MB to small areas where injection machinery may be difficult to use (TEAP 2008). However, they have been eliminated for soil use in many Article 5 countries as this application is considered to be less efficient for the control of soil-borne pathogens than injection methods. Use of canisters is also considered to be more dangerous to workers because trained contractors are not involved in its application. This practice also leads to high emissions of MB. Even though the Party did not present any management strategy, it stated that they hoped to register more alternatives for ginger by 2018 to possibly be able to phase out by 2018. According to reports presented to the ExCom, satisfactory pest and disease control has been obtained in ginger crops with the combination of high dosages of chloropicrin, improved application methods of this fumigant and dazomet, and use of other chemicals and biological nematicides, in an IPM approach. PIC is used for soil fumigation in areas where the main ginger soil-borne pathogens *Pythium spp.* and *Ralstonia solanacerum* are main pests. **MBTOC comments on economics in 2014 for 2015:** • Ginger prices have been increasing, so more farmers wish to produce it. Chloropicrin is the only registered alternative, but requires a long fumigation period and damages the ginger when applied in low temperatures. Besides, it does not control root-knot nematodes. With chloropicrin, planting time must therefore be postponed, and this affects yields, quality and time to market, resulting in a significant loss in net revenue. • Non-chemical alternatives include crop rotation, but land in China is scarce. Soilless systems require capital investment and trained farmers. Steam, is expensive. Other alternatives (soil disinfection, bio-fumigation) are technically infeasible given the particular growing conditions. • The Party argues that the price of ginger will be lower with chloropicrin (Methyl bromide: $9.02/kg; chloropicrin: $6.89/kg) because of the root-knot nematodes impact on the product quality • Yield with methyl bromide is 96.45 tonne/ha, while with chloropicrin is 86.22 tonne/ha, again because of the effect of root-knot nematodes. • Gross revenue with chloropicrin is 44% less than that of Methyl Bromide (because of the yield and price difference) • Net revenue is 25% of that of methyl bromide; put another way, net revenue has declined by well over two thirds. **Comments requested in Dec. XX1/11 (para 9)** • **Dec. IX/6 b(i) Emission Reduction:** VIF and TIF are produced in China, but are not used for ginger production due to very high cost and low efficacy under low temperatures. MB is applied every year during early spring or late autumn. • **Dec. IX/6 b(iii) MLF Assistance/Adoption of Effective Alternatives:** Research has been conducted on chemical alternatives (chloropicrin + DMDS, chloropicrin + fosthiazate and chloropicrin + avermectins). It is expected that some chemicals will be registered by 2018. China is trying also to develop the flame sterilization technology. • **Dec. IX/6 b(iii) Appropriate Effort:** Yes considered appropriate as experiments are being conducted to register chemical alternatives by 2018.												

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
China	Ginger Protected	30	[24]											

MBTOC recommendation for 2015:

MBTOC recommends a reduced amount of 24 tonnes of MB for this use in 2015.

MBTOC considers that the same rate of 40g/m^2 that is used for open field production of ginger in China should be feasible for ginger production in protected cropping as the pests are identical. MBTOC also considers that China produces and has trialled barrier films and that these films may be available in the future to further reduced dosage rates, and urges the Party to consider their adoption. China's current position is that these films do not provide an advantage in the cool soils used for ginger production in the Shandong region, however the barrier films do offer a means to further reduce emissions.

Nomination by the Party for 2015:

China nominated 30 tonnes of MB for Ginger production in protected cultivation (61.2 ha) at the rate of 50g/m^2 for use in 2015. This represents 12.24 % of the total ginger protected area. MB is applied annually. The target pests are similar to the open field production, i.e. *Ralstonia solanacearum, Pythium spp. Meloidogyne spp* and *Cyperus rotundus*. The request is only for ginger grown in the Shandong region where ginger is grown continuously and thus pressure from the target pests is high.

Circumstances of the nomination by the Party:

China is using small disposable canisters of MB (681 g/canister) for this use, using standard polyethylene films. It is applied as a cold gas (98:2), at a rate of 500 kg/ha. In China the registered MB application rate for canister use varies between 500 and 750 kg/ha (Aocheng, 2014). According to the Party, chloropicrin is the only chemical alternative registered in China for this sector. Chloropicrin did not provide effective control of *Meloidogyne spp* and *Cyperus rotundus,*. In addition, chloropicrin causes phytotoxicity and needs longer fumigation time obliging farmers to postpone the planting time which affects yield, quality and marketing. However, a recent study confirms that it is a promising alternative with good efficacy against *Ralstonia solanacearum*, which can be used successfully in integrated pest management programmes in China (Mao *et al*., 2014)

In spite of their proven efficiency, the other chemical alternatives 1,3-dichloropropene, dazomet, iodomethane, metam sodium and dimethyl disulfide and sulfuryl fluoride are not registered in China. Sulfuryl fluoride can be used as a soil fumigant to control root-knot nematodes and to reduce the levels of key soil pathogens (Aocheng *et al*. 2014). Chloropicrin and 1,3 D have been formulated in capsules, with Pic providing encouraging results (Mao *et al*., 2014) The tested 1,3-D/CP gel cap formulation provides a promising method for soil pest and disease control and reducing environmental emissions and potential human exposure in greenhouse vegetable cultivation (XiaoXue *et al*., 2013). Telone C-35 is an excellent MB alternative and has provided acceptable weed control efficacy (XiaoXue *et al*., 2013).

According to the Party, most of the reported non-chemical alternatives (crop rotation, bio-fumigation, solarization, steaming) are not technically and economically feasible.

VIF and TIF are produced in China, but are not used for ginger production due to very high cost and low efficacy under low temperatures. MB is applied every year during early spring or late autumn.

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	MBTOC interim assessment for MB use in this sector in 2015: MBTOC accepted the Parties information that alternatives are not available for this nomination, particularly as 1,3-D is unavailable for use in China. MBTOC however notes that other countries which applied MB using canisters on a small scale use have phased out for this sector and have identified alternatives (eg Japan). MBTOC considered that a use rate should be brought in line with the outdoor ginger production as the target pests are similar i.e. 40g/m^2 (without VIF or TIF). MBTOC notes that the rate is higher than the rates used for MB applied by canisters for ginger in Japan before they phased out MB. MBTOC considers that in the absence of effective alternatives MB/Pic 50:50 would be suitable for this sector, but China would need to develop technology to formulate and apply this MB/Pic formulation. MB considers that barrier films should be used in future for this use and urge the Party to consider accessing these films. MBTOC is also aware that chloropicrin combined with dimethyl disulphide or chloropicrin with fosthiazate have shown promising results (Aocheng, pers. comm.). MBTOC notes that the Party has been supported by the MLF with one demonstration project, three project preparation grants and one investment project consisting of eight tranches since 1994 and that many alternatives have been trialled (MLF, 2014a). The funding received from the MLF was support for investment projects and was committed to phase out its whole MB consumption for controlled uses by the end of 2014 (MLF, 2014b). As noted for the ginger open field nomination, use of canisters of MB have been eliminated for soil use in many Article 5 countries as this application is considered to be less efficient for the control of soil-borne pathogens than injection methods. Use of canisters is also considered to be more dangerous to workers because trained contractors are not involved in its application. This practice leads also to high emissions of MB. Canisters are used because they provide small-scale farmers with an easy application method and the ability to apply targeted amounts of MB to small areas where injection machinery may be difficult to use (TEAP 2008). Even though the Party did not present any management strategy, the Party stated that they hoped to register more alternatives for ginger by 2018 to possibly be able to phase out by 2018. According to reports presented to the ExCom , satisfactory pest and disease control has been obtained in ginger crops with the combination of high dosages of chloropicrin, improved application methods of this fumigant and of dazomet and use of other chemicals and biological nematicides, and IPM. PIC is used for soil fumigation in areas where the main ginger soil-borne pathogens *Pythium* spp. and *Ralstonia solanacerum*. In many countries, soil less culture has proven to be an excellent alternative to MB for ginger in protected cultivation e;g. Hawaii, USA (Maine), Mauritus and India (Hayden *et al*., 2004, Hepperly *et al*. 2004, Kratky 1998, Mamta and Shraddha 2013, Sato 1999, Sayed 1984, Singh and Singh 2012, Suhaimi *et a*l. 2012). MBTOC considers that this alternative should be considered in China for areas where MB is used for in ginger, especially in protected cultivation. The initial capital investment is not considered to be high because greenhouses are already available. Ginger farmers may also have available locally the basic systems of plastic bags, local substrate and adequate fertigation/ irrigation systems for setup of these systems. Training for a centralized region is also considered not to be prohibitive. During the MBTOC meeting an overview of soil less culture for ginger production was presented and is available to the Party. **MBTOC comments on economics in 2014 for 2015:** • Ginger prices have been increasing, so more farmers wish to produce it. Chloropicrin is the only registered alternative, but requires a longer period for fumigation time, and damages the ginger when applied in low temperatures and does not control root-knot nematodes. With chloropicrin, planting time must therefore be postponed, and this affects yields, quality and time to market, resulting in a significant loss in net revenue. • Non-chemical alternatives include crop rotation, but land is scarce and ginger is profitable, or soilless, which requires capital investment and more experienced farmers; or steam, which is expensive. Other alternatives (soil disinfection, bio-fumigation) are technically infeasible given the particular growing conditions. • Argues that the price of ginger will be lower with chloropicrin (Methyl bromide: $9.02/kg; chloropicrin: $6.89/kg because of the quality impact of root-knot nematodes. • Yield with methyl bromide is 96.45 t/ha, while with chloropicrin it is 86.22 t/ha, again because of the effect of root-knot nematodes. • Gross revenue with chloropicrin is 44% that of Methyl Bromide (because of the yield and price difference. • Net revenue is 25% of that of methyl bromide; put another way, net revenue has declined by well over two thirds.													

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	Comments requested in Dec. XX1/11 (para 9) • **Dec. IX/6 b(i) Emission Reduction:** VIF and TIF are produced in China, but are not used for ginger production due to very high cost and low efficacy under low temperatures. MB is applied every year during early spring or late autumn. • **Dec. IX/6 b(iii) MLF Assistance/Adoption of Effective Alternatives:** Research trials within the MLF-funded investment project commenced in this sector in 2008 and will be completed in 2014. Promising results have been obtained. Additionally, active research is being conducted on chemical alternatives (chloropicrin + DMDS, chloropicrin + fosthiazate and chloropicrin + avermectin). It is expected that some chemicals will be registered by 2018. China is trying also to develop the flame sterilization technology. • **Dec. IX/6 b(iii) Appropriate Effort**: Yes, considered appropriate as experiments are being conducted to register chemical alternatives by 2018												
Mexico	Raspberries	70	[41.418]											
	MBTOC interim recommendation for 2015: MBTOC recommends 41.418 t tonnes of MB for use in raspberry nurseries for 2015. This amount does not allow for the contingency amount requested for projected growth of the industry in 2015. MBTOC based the decision on the actual amount of MB reportedly consumed in the most recent full year of consumption in 2012 as 2013 data has not been reported. MBTOC acknowledges that past historic data may not have been complete as only two out of three growers reported their use of MB in 2012. This recommendation has been made as trials have only recently been initiated and there is reportedly insufficient data provided to the Party to evaluate the performance of alternatives for this relatively new industry. MBTOC considers that if results show feasibility that rapid adoption will follow. **Nomination by the Party for 2015:** The quantity requested for this CUN is 70 tonnes, for use in raspberry nursery stock production in the Jalisco and Michoacan States. MB formulations applied are 50:50, broadacre, in dosages of 200 kg/ha, once a year and normally not under VIF. This rate however conforms with MBTOCs standard presumption for nursery material. **Circumstances of the nomination by the Party:** The raspberry nursery industry in Mexico is evolving, and small low/medium technology production systems now coexist with large “professional” nursery producers similar to those found in California. The industry previously sourced transplants from California for many raspberry growers in Mexico. The transition includes confronting many of the same challenges facing California and the EU to produce raspberry nursery stock that meets the high health standards demanded by the marketplace. Trials of methyl bromide alternatives were recently initiated in 2012. This new industry is growing rapidly and the land area requiring methyl bromide is expected to continue to increase while the additional field trials are on-going. The party is requesting increased methyl bromide in anticipation of the expanded acreage for this industry. The Party states that the key pests affecting strawberry runner production are the fungi *Phytophthora, Pythium, Fusarium*, *Rhizoctonia, Verticillium, Colletotrichum,* and weeds such as *Cyperus* spp and *Malva neglecta*. Available alternatives -according to the nomination- cannot control target pests adequately to meet “market standards”, although no certification thresholds are established or												

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	required by regulation. However, a research program was put in place in 2012 and showed promising results especially with 1,3D + chloropicrin; and chloropicrin + metam sodium, followed by metam sodium alone. A new round of trials began in 2013/14 to obtain additional data about the efficacy of the alternatives (López Aranda *et al*.; 2012; Cotero *et al*., 2013; SEMARNAT – UNIDO; 2013). The Party anticipates that soilless systems would be expensive and require a significant investment as infrastructure does not exist. **MBTOC interim assessment for MB use in this sector in 2015:** MBTOC acknowledges that an active research program was recently initiated and recognizes that additional time is needed to conduct trials to gain confidence in the efficacy of the alternatives under Mexican conditions. MBTOC accepts that a quantity of MB is required for this industry at present and has used the most recent usage for the recommendation. MBTOC however considers the request for increased methyl bromide in anticipation of a potential increase in acreage to be a contingency request, rather than a request based on the current circumstances of the nomination. MBTOC does not recommend contingency requests. MBTOC notes that some parties have adopted a policy that they will not nominate methyl bromide for the purpose of increasing the acreage of a specific industry. MBTOC encourages this party to consider adopting a similar policy. MBTOC notes that the Party has been supported by the MLF with 2 demonstration and 2 technical assistance projects plus 4 project preparation grants, and one investment project also funded bilaterally by Italy and Canada since 1998, and that many alternatives have been trialled across a range of sectors (MLF, 2014a), although trials for this sector started only recently (SEMARNAT-UNIDO, 2014). The funding has been received from the MLF to support Mexico with the phase out its whole MB consumption for controlled uses by the end of 2013 (MLF, 2014b). **MBTOC comments on economics in 2014 for 2015:** • Because Methyl bromide alternatives are not yet used commercially for raspberry nurseries in Mexico, there is still limited information on their cost and feasibility, especially because nursery production requires cleaner plants than fruiting fields. • Data on the production costs with methyl bromide are however provided for future comparison. • For strawberries the cost of application of chloropicrin and 1.3D-Pic is roughly comparable to that of methyl bromide, while application of metam sodium is around a third of the cost • For raspberries only the cost of methyl bromide application is available. **Comments Requested in Dec. XX1/11 (para 9):** • **Dec. IX/6 b(i) Emission Reduction:** Most growers do not use barrier films (VIF or TIF), although some growers are beginning to try it. The research program includes low permeability films. The formulation of MB/Pic is 50:50, which contributes to emission reduction. • **Dec. IX/6 b(iii) MLF Assistance/Adoption of Effective Alternatives:** Trials in an MLF project commenced in this sector in 2011/2012 and will be completed in 2014. Promising results have been obtained. • **Dec. IX/6 b(iii) Appropriate Effort:** Research effort is adequate.													

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
Mexico	Strawberries	70	[43.539]											

MBTOC Recommendation for 2015:

MBTOC recommends 43.539 t of MB for use in strawberry nurseries for 2015. This amount does not allow for the contingency amount requested for projected growth of the industry in 2015, and has based the decision on the actual amount of MB reportedly consumed in 2013. MBTOC also notes that some Parties have adopted a policy that they will not nominate MB for the purpose of increasing the acreage of a specific industry. Also, that the use for strawberry nurseries commenced after 2005 when consumption was capped at 80%. A recommendation has been proposed, as trials have only recently been initiated and there is reportedly insufficient data provided to the Party to evaluate the performance of alternatives for this relatively new industry. MBTOC considers that if results show feasibility that rapid adoption of alternatives will follow.

Nomination by the Party for 2015:

The quantity requested for this CUN is 70 tonnes, for use in strawberry runner production in the Jalisco and Michoacan States. MB formulations applied are 50:50, broad acre, in dosages of 200 kg/ha, once a year and normally not under VIF.

Circumstances of the nomination by the Party:

The strawberry nursery industry in Mexico is evolving, and small low/medium technology production systems now coexist with large "professional" nursery producers similar to those found in Spain and California that were previously the source of transplants for many berry growers in Mexico. This transition includes confronting many of the same challenges facing Spain, California, Australia, and Canada to produce strawberry runners that meet the high health standards demanded by the marketplace. Trials of methyl bromide alternatives were recently initiated in 2012.

This new industry is growing rapidly and the land area requiring methyl bromide is expected to continue to increase while the additional trials are ongoing. The party is requesting increased methyl bromide in anticipation of the expanded acreage for this industry.

The Party states that the key pests affecting strawberry runner production are the fungi *Phytophthora, Pythium, Fusarium*, *Rhizoctonia, Verticillium, Colletotrichum,* and weeds such as *Cyperus* spp and *Malva neglecta*. Nematodes and *Macrophomina* were specifically excluded as problems, for the moment, in the Party´s responses to MBTOC.

Available alternatives -according to the nomination- cannot control target pests adequately to meet "market standards", although no certification thresholds are established or required by regulations. However, a research program was put in place in 2012 and showed promising results especially with 1,3D + chloropicrin; and chloropicrin + metam sodium, followed by metam sodium alone. A new round of trials began in 2013/14 to obtain additional data on the efficacy of the alternatives (López Aranda *et al*.; 2012; Cotero *et al*., 2013; SEMARNAT – UNIDO, 2013). The Party anticipates that soilless systems would be expensive and require a significant investment as infrastructure does not exist.

MBTOC interim assessment for MB use in this sector in 2015:
MBTOC acknowledges that the active research program was recently initiated and recognizes that additional time is needed to conduct trials to determine the efficacy of alternatives under Mexican conditions. MBTOC notes that although the nominating industry is recent and uses more sophisticated management approaches, there are traditional nurseries in the country that do not use MB fumigation at all (INIFAP; 2011).

Country	Industry	CUN for 2015	MBTOC interim recommendation for 2015											
	MBTOC considers the request for increased methyl bromide in anticipation of a potential increase in acreage to be a contingency request, rather than a request based on the current circumstances of the nomination. MBTOC does not recommend contingency requests and has adjusted the recommendation to remove the contingency amount of methyl bromide. MBTOC notes that some Parties have adopted a policy that they will not nominate methyl bromide for the purpose of increasing the acreage of a specific industry. MBTOC notes that the Party has been supported by the MLF with 2 demonstration and 2 technical assistance projects plus 4 project preparation grants, and one investment project also funded bilaterally by Italy and Canada since 1998, and that many alternatives have been trialled across a range of sectors (MLF, 2014a), although trials for this sector started only recently (SEMARNAT-UNIDO, 2014). The funding has been received from the MLF to support Mexico with the phase out its whole MB consumption for controlled uses by the end of 2013 (MLF, 2014b). **MBTOC comments on economics in 2014 for 2015:** The nomination was not based on economic arguments. **Comments Requested in Dec. XX1/11 (para 9):** • **Dec. IX/6 b(i) Emission Reduction**: Most growers do not use VIF or TIF, although some growers are beginning to try it. The research program includes low permeability films. Formulation is 50:50 which contributes to emission reduction. • **Dec. IX/6 b(ii) MLF Assistance/Adoption of Effective Alternatives:** Trials in an MLF project commenced in this sector in 2011/2012 and will be completed in 2014. Promising results have been obtained. • **Dec. IX/6 b(iii) Appropriate Efforts:** Research effort is adequate.												

1.5 Interim evaluation of CUNs: Structures and Commodities

A group of MBTOC members, appointed by the co-chairs, assessed the single remaining CUN in the SC sector submitted in 2014 for 2016 (US dry cure pork). Discussion was later held in plenary to discuss the proposed recommendation and reach consensus. Information provided during the bilateral discussion held via teleconference with the US delegation and experts on alternatives to MB for cured ham were considered in the course of the assessment.

1.5.1 Standard rate presumptions

MBTOC assessed the SC CUN for appropriate MB dosage rates and deployment of MB emission/use reduction technologies, such as appropriate sealing techniques.

Decision IX/6 requires that critical uses should be permitted only if '*all technically and economically feasible steps have been taken to minimise the critical use and any associated emission of methyl bromide*'. Decision Ex.II/1 also mentions emission minimisation techniques, requesting Parties "…*to ensure, wherever methyl bromide is authorised for critical-use exemptions, the use of emission minimisation techniques that improve gas tightness or the use equipment that captures, destroys and/or reuses the methyl bromide and other techniques that promote environmental protection, whenever technically and economically feasible.*"

With the beginning of the CUN process in 2005, MBTOC published its standard presumptions for structures (20g m^{-3}) and indicated that the European Plant Protection Organization's (EPPO) published dosage rates for commodities should be considered standard best practice for fumigation worldwide. Since that time all Parties submitting CUNs stated their adherence to those practices. The EPPO dosage rates for commodity treatment vary by commodity, sorption rate and environmental conditions. They can be found in annexes to the MBTOC 2006 Assessment Report (MBTOC, 2007). Where possible, reduced dosages, combined with longer exposure periods, can reduce MB consumption, while maintaining efficacy (MBTOC 2007).

1.5.2. Details of the evaluation

The total MB volume nominated in 2014 for post-harvest uses in 2016 was 3.240 tonnes. MBTOC recommended 3.240 tonnes (Table 1.11 and 1.12). Table 1-12 provides the MBTOC-SC interim recommendation for the CUN submitted.

Table 1-11. Summary of the interim recommendations for a CUE for postharvest uses of MB (tonnes) for 2016 submitted in the 2014 round.

Country and Sector	**Nominated in 2014 (tonnes)**	**Recommended for 2016 (tonnes)**
United States - Dry cure pork	3.240	[3.240]
Total	**3.240**	**[3.240]**

Table 1-12. **Interim evaluation of CUNs from non A5 Parties for structures and commodities submitted in 2014 for 2016**

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014[10]	CUE for 2015[11]	CUN for 2016	MBTOC Rec. for 2016
United States	Dry Cure Pork	67.907	40.854	18.998	19.669	18.998	4.465	3.73	3.730	3.730	3.730	**3.240**	**3.240**	**[3.240]**

MBTOC interim recommendation for 2016:

MBTOC recommends 3.240 tonnes, the amount nominated by the Party for use in US Southern dry cure pork in long storage in 2016.

Nomination by the Party for 2016:

The Party nominated 3.240 tonnes, the same amount granted by the Parties for this use in 2015.

Circumstances of the nomination:

Presently, there is still no commercially effective and economically feasible alternatives to methyl bromide for the specialised disinfestation of ham houses containing Southern dry cure pork, a unique regional, traditional product, that is stored (cured) for long periods. Previous reductions in methyl bromide consumption have been achieved through improvements in fumigation practice, reduced curing time and reduced frequency of fumigation. The nomination states that there is no further scope for reduction through similar changes. The pests of this product are the red-legged ham beetle (*Necrobia rufipes*) and the ham mite (*Tyrophagus putrescentiae*), with the mite being particularly difficult to control to US food hygiene standards (nil tolerance on inspection). Many ham houses using short curing times do not now use methyl bromide fumigation.

There is an ongoing multi-university, multi-state research program which is focused on improving processing sanitation, IPM and pest control through a variety of possible fumigants and physical processes (Amoah *et al*., 2012; Phillips, 2013a, b). The Party has previously reported processors and researchers were trying steam cleaning, use of approved disinfectants with acaricidal properties, dips and coatings, to protect hams in store. The results of investigations with various alternative fumigants and nonchemical treatments on the ham mite *Tyrophagus putrescentiae* have not yet been fully successful (e.g. Abbar *et al*., 2012; 2013; Zhao *et al*., 2012a, b). Recently, a commercial trial was carried out with phosphine applied as magnesium phosphide for mite control (Phillips, 2013c). While this was successful in controlling the mites, corrosion damage to exposed electronics in the houses was unacceptable.

Southern dry cure pork processors only fumigate when the pests, or signs of the pests, are present.

MBTOC interim assessment for MB Use in this sector in 2016:

The US has a continuing and robust research program into methyl bromide replacement for this specific situation and commodity. A number of promising lines of investigation have been identified. These include various dips, some insecticide formulations and sulfuryl fluoride fumigation with added heat. No effective and viable replacements on a commercial scale have been identified at this time, though use of phosphine appears most promising with some modifications in application technique. MBTOC notes that there are well-known techniques for preventing phosphine-related corrosion, including sealing and other protection of the susceptible components.

Country	Industry	CUE for 2005[1]	CUE for 2006[2]	CUE for 2007[3]	CUE for 2008[4]	CUE for 2009[5]	CUE for 2010[6]	CUE for 2011[7]	CUE for 2012[8]	CUE for 2013[9]	CUE for 2014[10]	CUE for 2015[11]	CUN for 2016	MBTOC Rec. for 2016
	There appears to be scope for further reduction in frequency of treatment through better pest monitoring and fumigation techniques. MBTOC notes that recapture is not currently used for reduction of emissions in the absence of alternatives and that there are recapture units commercially available. **MBTOC comments on economics in 2014 for 2016:** The CUN rests on technical infeasibility, so no economic analysis was conducted. **Comments requested in Dec. XX1/11 (para 9)** • **Dec. IX/6 b(i) Emission Reduction**: The CUN states that improvements in sealing and fumigant containment have been made. • **Dec. IX/6 b(iii) Research Program**: There is an ongoing program testing and trialling promising alternatives • **Dec. IX/6 b(iii) Appropriate Effort**: see above													

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ANNEX 1: Decision IX/6

1. To apply the following criteria and procedure in assessing a critical methyl bromide use for the purposes of control measures in Article 2 of the Protocol:

(a) That a use of methyl bromide should qualify as "critical" only if the nominating Party determines that:

(i) The specific use is critical because the lack of availability of methyl bromide for that use would result in a significant market disruption; and

(ii) There are no technically and economically feasible alternatives or substitutes available to the user that are acceptable from the standpoint of environment and health and are suitable to the crops and circumstances of the nomination;

(b) That production and consumption, if any, of methyl bromide for critical uses should be permitted only if:

(i) All technically and economically feasible steps have been taken to minimise the critical use and any associated emission of methyl bromide;

(ii) Methyl bromide is not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide, also bearing in mind the developing countries' need for methyl bromide;

(iii) It is demonstrated that an appropriate effort is being made to evaluate, commercialise and secure national regulatory approval of alternatives and substitutes, taking into consideration the circumstances of the particular nomination and the special needs of Article 5 Parties, including lack of financial and expert resources, institutional capacity, and information. Non-Article 5 Parties must demonstrate that research programmes are in place to develop and deploy alternatives and substitutes. Article 5 Parties must demonstrate that feasible alternatives shall be adopted as soon as they are confirmed as suitable to the Party's specific conditions and/or that they have applied to the Multilateral Fund or other sources for assistance in identifying, evaluating, adapting and demonstrating such options;

2. To request the Technology and Economic Assessment Panel to review nominations and make recommendations based on the criteria established in paragraphs 1 (a) (ii) and 1 (b) of the present decision;

3. That the present decision will apply to Parties operating under Article 5 and Parties not so operating only after the phase-out date applicable to those Parties.

Para. 2 of Decision IX/6 does not assign TEAP the responsibility for determining the existence of "significant market disruption" specified in paragraph 1(a)(i).

TEAP assigned its Methyl Bromide Technical Options Committee (MBTOC) to determine whether there are *no technically and economically feasible alternatives or substitutes available to the user that are acceptable from the standpoint of environment and health and are suitable to the crops and circumstances of the nomination*, and to address the criteria listed in Decision IX/6 1(b).

ANNEX II - Part A: Historic Trends in Preplant Soil Nominations and Exemptions for MB Use

List of nominated (2005 – 2015) and exempted (2005 – 2014) amounts of MB granted by Parties under the CUE process for each crop.

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	Cut Flowers – field	40.000	22.350										18.375	22.350								
Australia	Cut flowers – protected	20.000											10.425									
Australia	Cut flowers, bulbs – protected Vic	7.000	7.000	6.170	6.150								7.000	7.000	3.598	3.500						
Australia	Strawberry Fruit	90.000											67.000									
Australia	Strawberry runners	35.750	37.500	35.750	35.750	29.790	29.790	29.790	29.790	29.760	29.760	**29.760**	35.750	37.500	35.750	35.750	29.790	29.790	23.840+ 5.95	29.760	29.760	**29.760**
Belgium	Asparagus	0.630	0.225										0.630	0.225								
Belgium	Chicory	0.600	0.180										0.180	0.180								
Belgium	Chrysanthemums	1.800	0.720										1.120									
Belgium	Cucumber	0.610	0.545										0.610	0.545								
Belgium	Cut flowers – other	6.110	1.956										4.000	1.956								
Belgium	Cut flowers – roses	1.640																				
Belgium	Endive (sep from lettuce)		1.650											1.650								
Belgium	Leek & onion seeds	1.220	0.155										0.660									

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Belgium	Lettuce(& endive)	42.250	22.425										25.190									
Belgium	Nursery	Not Predictable	0.384										0.900	0.384								
Belgium	Orchard pome & berry	1.350	0.621										1.350	0.621								
Belgium	Ornamental plants	5.660											0.000									
Belgium	Pepper & egg plant	5.270	1.350										3.000	1.350								
Belgium	Strawberry runners	3.400	0.900										3.400	0.900								
Belgium	Tomato (protected)	17.170	4.500										5.700	4.500								
Belgium	Tree nursery	0.230	0.155										0.230	0.155								
Canada	Strawberry runners (PEI)	14.792	6.840	7.995	7.462	7.462	7.462	5.261	5.261	5.596	5.261	**5.261**	(a)14.792	6.840	7.995	7.462	7.462	7.462	5.261	5.261	5.261	**5.261**
Canada	Strawberry runners (Quebec)		1.826	1.826									(a)	1.826	1.826							
Canada	Strawberry runners (Ontario)			6.129											6.129							
France	Carrots	10.000	8.000	5.000									8.000	8.000	1.400							
France	Cucumber	85 revised to 60	60.000	15.000									60.000	60.000	12.500							
France	Cut-flowers	75.000	60.250	12.000									60.000	52.000	9.600							
France	Forest tree nursery	10.000	10.000	1.500									10.000	10.000	1.500							
France	Melon	10.000	10.000										7.500	6.000								

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
France	Nursery: orchard, raspberry	5.000	5.000	2.000									5.000	5.000	2.000							
France	Orchard replant	25.000	25.000	7.500									25.000	25.000	7.000							
France	Pepper	Incl in.tomato cun	27.500	6.000										27.500	6.000							
France	Strawberry fruit	90.000	86.000	34.000									90.000	86.000								
France	Strawberry runners	40.000	4.000	35.000									40.000	40.000	28.000							
France	Tomato (and eggplant for 2005 only)	150(all solanaceo us)	60.500	33.250									125.000	48.400								
France	Eggplant		27.500	33.250										48.400								
Greece	Cucurbits	30.000	19.200										30.000	19.200								
Greece	Cut flowers	14.000	6.000										14.000	6.000								
Greece	Tomatoes	180.000	73.600										156.000	73.600								
Israel	Broomrape			250.000	250.000	125.000	12.500	12.500							250.000	250.000	125.000	12.500				
Israel	Cucumber - protected new 2007			25.000	18.750		18.750	12.500							25.000	18.750	-	15.937				
Israel	Cut flowers – open field	77.000	67.000	80.755	53.345	42.777	42.554	23.292					77.000	67.000	74.540	44.750	34.698	28.554				
Israel	Cut flowers – protected	303.000	303.000	321.330	163.400	113.821	72.266	52.955					303.000	240.000	220.185	114.450	85.431	63.464				
Israel	Fruit tree nurseries	50.000	45.000	10.000									50.000	45.000	7.500							

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Israel	Melon – protected & field	148.000	142.000	140.000	87.500	87.500	87.500	35.000					125.650	99.400	105.000	87.500	87.500	70.000				
Israel	Potato	239.000	231.000	137.500	93.750	75.000							239.000	165.000	137.500	93.750	75.000					
Israel	Seed production	56.000	50.000			22.400							56.000	28.000			NR					
Israel	Strawberries – fruit (Sharon)	196.000	196.000	176.200	64.125	52.250	47.500	28.500					196.000	196.000	93.000	105.960	42.750					
Israel	Strawberries – fruit (Sharon & Ghaza)																	57.063				
Israel	Strawberry runners (Sharon)	35.000	35.000		20.000	15.800	13.570	13.500					35.000	35.000	28.000	31.900	15.825					
Israel	Strawberry runners and fruit Ghaza				87.875	67.500	67.500	34.000									47.250					
Israel	Strawberry runners (Sharon & Ghaza)																	22.320				
Israel	Tomatoes			90.000											22.750							
Israel	Sweet potato					95.000	20.000	20.000								111.500	95.000	20.000				
Italy	Cut flowers (protected)	250.000	250.000	30.000									250.000	187.000	30.000							
Italy	Eggplant (protected)	280.000	200.000	15.000									194.000	156.000								
Italy	Melon (protected)	180.000	135.000	10.000									131.000	131.000	10.000							

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Italy	Pepper (protected)	220.000	160.000	67.000									160.000	130.000	67.000							
Italy	Strawberry Fruit (Protected)	510.000	400.000	35.000									407.000	320.000								
Italy	Strawberry Runners	100.000	120.000	35.000									120.000	120.000	35.000							
Italy	Tomato (protected)	1300.000	1030.00	418.000									871.000	697.000	80.000							
Japan	Cucumber	88.300	88.800	72.400	68.600	61.400	34.100	29.120	26.162				88.300	88.800	72.400	51.450	34.300	30.690	27.621			
Japan	Ginger – field	119.400	119.400	112.200	112.100	102.200	53.400	47.450	42.235				119.400	119.400	109.701	84.075	63.056	53.400	47.450			
Japan	Ginger – protected	22.900	22.900	14.800	14.800	12.900	8.300	7.770	6.558				22.900	22.900	14.471	11.100	8.325	8.300	7.036			
Japan	Melon	194.100	203.900	182.200	182.200	168.000	90.800	77.600	67.936				194.100	203.900	182.200	136.650	91.100	81.720	73.548			
Japan	Peppers (green and hot)	189.900	200.700	169.400	162.300	134.400	81.100	68.260	61.101				187.200	200.700	156.700	121.725	81.149	72.990	65.691			
Japan	Watermelon	126.300	96.200	94.200	43.300	23.700	15.400	13.870	12.075				129.000	98.900	94.200	32.475	21.650	14.500	13.050			
Malta	Cucumber		0.096											0.127								
Malta	Eggplant		0.128											0.170								
Malta	Strawberry		0.160											0.212								
Malta	Tomatoes		0.475											0.594								
New Zealand	Nursery material	1.085	1.085											0								
New Zealand	Strawberry fruit	42.000	42.000	24.78									42.000	34.000	12.000							

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
New Zealand	Strawberry runners	10.000	10.000	5.720									8.000	8.000	6.234							
Poland	Strawberry Runners	40.000	40.000	25.000	12.000								40.000	40.000	24.500							
Portugal	Cut flowers	130.000	8.750										50.000	8.750								
Spain	Cut Flowers – Cadiz	53.000	53.000	35.000									53.000	42.000								
Spain	Cut Flowers – Catalonia	20.000	18.600	12.840	17 (+Andalucia)								20.000	15.000	43.490 (+Andalucia)							
Spain	Pepper	200.000	155.000	45.000									200.000	155.000	45.000							
Spain	Strawberry Fruit	556.000	499.290	80.000									556.000	499.290	0.0796							
Spain	Strawberry Runners	230.000	230.000	230.000	215.000								230.000	230.000	230.000							
UK	Cut flowers		7.560											6.050								
UK	Ornamental tree nursery	12.000	6.000										6.000	6.000								
UK	Strawberry (& raspberry in 2005)	80.000	63.600										68.000	54.500								
UK	Raspberry nursery		4.400										4.400	54.500								
USA	Chrys. Cuttings/roses	29.412											29.412	0								
USA	Cucurbits – field	1187.8	747.839	598.927	588.949	411.757	340.405	218.032	59.500	11.899			1187.800	747.839	592.891	486.757	407.091	302.974	195.698	59.500		

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
USA	Eggplant – field	76.761	101.245	96.48	79.546	62.789	34.732	21.561	6.904	1.381			76.721	82.167	85.363	66.018	48.691	32.820	19.725	6.904		
USA	Forest nursery seedlings	192.515	157.694	152.629	133.140	125.758	120.853	106.043					192.515	157.694	122.032	131.208	122.060	117.826	93.547			
USA	Ginger	9.2											9.2	0								
USA	Orchard replant	706.176	827.994	405.415	405.666	314.007	226.021	203.591	18.324	6.230			706.176	527.600	405.400	393.720	292.756	215.800	183.232	18.324		
USA	Ornamentals	210.949	162.817	149.965	138.538	137.776	95.204	70.178	48.164	48.164			154.000	148.483	137.835	138.538	107.136	84.617	64.307	48.164		
USA	Nursery stock - fruit trees, raspberries, roses	45.789	64.528	12.684	51.102	27.663	17.954	7.955	1.591	0.541			45.800	64.528	28.275	51.102	25.326	17.363	7.955	1.591		
USA	Peppers – field	1094.782	1498.53	1151.751	919.006	783.821	463.282	212.775	28.366				1094.782	1243.542	1106.753	756.339	548.984	463.282	206.234			
USA	Strawberry fruit – field	2468.873	1918.40	1733.901	1604.669	1336.754	1103.422	1023.471	753.974	531.737	415.067	**373.660**	2052.846	1730.828	1476.019	1349.575	1269.321	1007.477	812.709	678.004	415.067	**415.067**
USA	Strawberry runners	54.988	56.291	4.483	8.838	8.837	7.381	7.381	3.752	3.752			54.988	56.291	4.483	8.838	7.944	4.690 + 2.018	6.036	3.752		
USA	Tomato – field	2876.046	2844.985	2334.047	1840.1	1406.484	994.582	336.191	54.423	10.741			737.584	2476.365	2065.246	1406.484	1003.876	737.584	292.751	54.423		
USA	Turfgrass	352.194	131.600	78.040	52.189	0								131.600	78.04	0						
USA	Sweet potato	224.528			18.144	18.144	18.144	14.515	8.709							18.144	18.144	14.515	11.612			
USA	Research								2.768	2.768												

ANNEX III– Part B: Historic Trends in Structural and Commodity Nominations and Exemptions for MB Use

List of nominated (2005- 2015) and exempted (2005 - 2014) amounts of MB granted by Parties under the CUE process for each commodity.

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	Almonds	1.900	2.100										1.900	2.100								
Australia	Rice consumer packs	12.300	12.300	10.225	9.200 +1.8	9.2	7.82	5.66	3.653	2.374	1.187	**1.187**	6.150	6.150	9.205	9.200	7.820	6.650	4.870	3.653	1.187	**1.187**
Belgium	Artefacts and structures	0.600	0.307										0.590	0.307								
Belgium	Antique structure & furniture	0.750	0.199										0.319	0.199								
Belgium	Churches, monuments and ships' quarters	0.150	0.059										0.150	0.059								
Belgium	Electronic equipment	0.100	0.035										0.100	0.035								
Belgium	Empty silo	0.050	0.043										0.050	0.043								
Belgium	Flour mill see mills below	0.125	0.072										See mills below	0.072								
Belgium	Flour mills	10.000	4.170										9.515	4.170								
Belgium	Mills	0.200	0.200										0.200	0.200								
Belgium	Food processing facilities	0.300	0.300										0.300	0.300								

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Belgium	Food Processing premises	0.030	0.030										0.030	0.030								
Belgium	Food storage (dry) structure	0.120	0.120										0.120	0								
Belgium	Old buildings	7.000	0 .306										1.150	0.306								
Belgium	Old buildings and objects	0.450	0.282										0	0.282								
Belgium	Woodworking premises	0.300	0.101										0.300	0.101								
Canada	Flour mills	47.200	34.774	30.167	28.650	26.913	22.878	14.107	11.020	7.848	5.044	**5.044**	(a)47	34.774	30.167	28.65	26.913	22.878	14.107	11.020	5.044	**5.044**
Canada	Pasta manufacturing facilities	(a)	10.457	6.757	6.067	4.740	4.740	2.084					(a)	10.457	6.757	6.067	4.740	3.529				
Canada	Commodities					0.068																
France	Seeds sold by PLAN-SPG company	0.135	0.135	0.100									0.135	0.135	0.096							
France	Mills	55.000	40.000	8.000									40.000	35.000	8.000							
France	Rice consumer packs	2.000	2.000										2.000	2.000								
France	Chestnuts	2.000	2.000	1.800									2.000	2.000	1.800							
Germany	Artefacts	0.250	0.100										0.250	0.100								

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Germany	Mills and Processors	45.000	19.350										45.000	19.350								
Greece	Dried fruit	4.280	3.081	0.900									4.280	3.081	0.450							
Greece	Mills and Processors	23.000	16.000	1.340									23.000	15.445	1.340							
Greece	Rice and legumes		2.355											2.355								
Ireland	Mills		0.888	0.611										0.888								
Israel	Artefacts	0.650	0.650	0.600									0.650	0.6500								
Israel	Dates (post harvest)	3.444	3.444	2.200	1.800	2.100							3.444	2.755	2.200	1.800	2.100	1.040				
Israel	Flour mills (machinery & storage)	2.140	1.490	1.490	0.800	0.300							2.140	1.490	1.040	0.312	0.300					
Israel	Furniture–imported	1.4220	1.4220	2.0420									1.4220	0								
Italy	Artefacts	5.500	5.500	5.000									5.225	0	5.000							
Italy	Mills and Processors	160.000	130.000	25.000									160.000	65.000	25.000							
Japan	Chestnuts	7.100	6.500	6.500	6.300	5.800	5.400	5.350	3.489	3.317			7.100	6.800	6.500	6.300	5.800	5.400	5.350	3.489		
Latvia	Grains		2.502											2.502								
Netherlands	Strawberry runners post harvest		0.120	0.120		0.120								0	0.120							
Poland	Medicinal herbs & dried mushrooms as dry commodities	4.000	3.560	1.800	0.500								4.100	3.560	1.800	1.800						

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Poland	Coffee, cocoa beans	(a)	2.160	2.000	0.500									2.160	1.420	1.420						
Spain	Rice		50.000											42.065								
Switzerland	Mills & Processors	8.700	7.000										8.700	7.000								
UK	Aircraft			0.165											0.165							
UK	Mills and Processors	47.130	10.195	4.509									47.130	10.195	4.509							
UK	Cereal processing plants		8.131	3.480					(a)					8.131								
UK	Cheese stores	1.640	1.248	1.248									1.640	1.248	1.248							
UK	Dried commodities (rice, fruits and nuts) Whitworths	2.400	1.256										2.400	1.256								
UK	Herbs and spices	0.035	0.037	0.030									0.035	0.037								
UK	Mills and Processors (biscuits)	2.525	1.787	0.479									2.525	1.787								
UK	Spices structural equip.	1.728											1.728	0	0.479							
UK	Spices stored	0.030											0.030	0								
UK	Structures buildings (herbs and spices)	3.000	1.872	0.908									3.000	1.872	0.908							

Party	Industry	Total CUN MB Quantities											Total CUE Quantities									
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
UK	Structures, processors and storage (Whitworths)	1.100	0.880	0.257									1.100	0.880	0.257							
UK	Tobacco equipment	0.523											0.050									
UK	Woven baskets	0.770											0.770									
USA	Dried fruit and nuts (walnuts, pistachios, dried fruit and dates and dried beans)	89.166	87.719	91.299	67.699	58.912	19.242	10.041	2.419	0.822	0.740	**0.310**	89.166	87.719	78.983	58.921	45.623	19.242	5.000	2.419	0.740	**0.740**
USA	Dry commodities/ structures (cocoa beans)	61.519	61.519	64.028	52.256	51.002							61.519	55.367	64.082	53.188						
USA	Dry commodities/ structures (processed foods, herbs and spices, dried milk and cheese processing facilities) NPMA	83.344	83.344	85.801	72.693	66.777	37.778	17.365	0.200				83.344	69.118	82.771	69.208	54.606	37.778	17.365			
USA	Smokehouse hams (Dry cure pork products) (building and product)	136.304	135.742	40.854	19.669	19.699	4.465	3.730	3.730	3.730	3.730	**3.730**	67.907	81.708	18.998	19.699	18.998	4.465	3.730	3.730	3.730	**3.730**
USA	Mills and Processors	536.328	505.982	401.889	362.952	291.418	173.023	135.299	74.51	25.334	22.800		483.000	461.758	401.889	348.237	291.418	173.023	135.299	74.510	22.800	**22.800**
USA	Research								0.159	0.159												